



Academic Program and Course Description Guide

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The Introduction:

The educational program is a coordinated and organized package of courses that includes procedures and experiences organized into course vocabulary. Its main purpose is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market. It 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 brief summary of the program's main features and courses, indicating the skills that students are working to acquire based on the academic program's objectives. The importance of this description is evident in that it represents the cornerstone for obtaining program accreditation, and it is written by the teaching staff under the supervision of the scientific committees in the academic departments

This second edition of the guide includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and changes in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, semester system) as well as adopting the generalized academic program description according to the Department of Studies' letter T M3/2906 dated 3/5/2023 with regard to programs that adopt the Bologna Process as the basis for their work

In this regard, we cannot but emphasize the importance of writing descriptions of academic programs and courses to ensure the smooth running of the educational process

:Concepts and terminology

Academic program description:

,The academic program description provides a concise summary of its vision mission, and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies

Course description:

It provides a concise summary of the course's key features and expected learning outcomes, demonstrating whether the student has made the most of the available learning opportunities. It is derived from the program description

Program vision:

Excellence and sophistication in academic education, leadership in community service, and quality in scientific research in the fields of combating desertification

Program message:

Contributing to the achievement of sustainable development by preparing a specialized agricultural engineer qualified to work in the fields of soil science, water resources and combating desertification, committed to professional ethics, highly competent in scientific and applied skills, and able to meet the needs of the local regional and global labor market and serve the community at a competitive level through the development of scientific research skills

Program objectives:

1. Qualifying specialized scientific personnel, educators with scientific competencies in the field of combating desertification, who are able to face the challenges of the profession, compete with their peers in society and meet the needs of the labor market
2. Developing a modern, stimulating educational environment equipped with the latest technologies and advanced equipment enables the student to compete, innovate, and excel, and creates in him the desire to continue learning, develop himself and his skills, improve his performance, work within a team, and make decisions in the field of combating desertification
3. Training a cadre familiar with agricultural legislation, legal and social issues, work ethics, and quality management related to agricultural fields, especially those related to soil science and combating desertification
4. Managing and utilizing various resources and addressing problems in agricultural facilities and projects efficiently and with good performance in the field of soil science and combating desertification within the framework of preserving natural resources, biodiversity and sustainable development.

Curriculum structure:

All courses/study materials included in the academic program according to the approved learning system (semester, annual, Bologna track) whether they are required (Ministry, University, College and Scientific Department) with the number of study units

Learning outcomes:

A compatible set of knowledge, skills, and values acquired by the student after the successful completion of the academic program. The learning outcomes for each course must be defined in a way that achieves the program's objectives

Teaching and learning strategies:

These are the strategies used by faculty members to enhance student teaching and learning; they are plans followed to achieve learning objectives. In other words they describe all classroom and extracurricular activities aimed at achieving the program's learning outcomes

Academic Program Description Form

University Name: Northern Technical University

Faculty/Institute: Agricultural Technical College/Mosul

Scientific Department: Desertification Control Technologies

Academic or Professional Program Name: Bachelor's

Final Certificate Name: Technical Bachelor's in Desertification Control

Academic System: Courses

Description Preparation Date: 15/9/2025

File Completion Date: 15/9/2025

Signature:



Head of Department Name:

Dr. Ahmed Fares salem

Date: 15/9/2025

Signature:



Scientific Associate Name:

Dr. Hesham Hashem Mohammed

Date: 15/9/2025

The file is checked by:

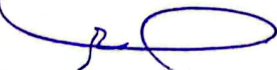
Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Haneen Mowfak Ahmed

Date: 15/9/2025

Signature:



Approval of the Dean

1. Program Vision

to divide Technologies Combat desertification It is pioneer in development and application Solutions Sustainable To combat desertification and recovery Degraded lands, Which Contributes in protection the environment and strengthening Security .food and development Sustainable

2. Program message

The Department of Desertification Control Technologies seeks to provide innovative research and develop effective technologies to combat desertification, through , Cooperation with academic and governmental institutions and local communities and to raise awareness about the importance of conservation. Soil and natural ,resources, and promoting environmental sustainability through education, training applied projects, and the continuous pursuit of developing faculty members and staff in the department and providing consulting and teaching services in the department's . specialized fields

3. Program objectives

The Department of Desertification Control Technologies aims to graduate a cadre capable of working on the main axes of desertification control science and sustainable development, and keeping pace with scientific and technological progress through the development of quality educational plans and curricula that contribute to the formation of academic and research cadres in the field of :desertification control capable of contributing to serving the community as follows

- 1- Building a strong foundation of knowledge in the field of combating desertification among students and providing distinguished educational programs of high quality that contribute to providing students with the foundations of knowledge and developing students' abilities in analytical thinking to prepare pioneers of .creative and talented youth
- 2- Diagnosis Signs desertification and use Programs Computer To predict In it.
- 3- .resistance Erosion wind Installation dunes The sandy one
- 4- harvest Water And how account what maybe safe From it Using the programs Computer science.
- 5- to set Varieties resistance For dryness For the environment The desert.
- 6- rationing waters Irrigation and increase efficiency Use it.

7- re Use Water The returnee (waters Drains And the exchange The healthy one(.(

8- Use Programs Prediction And maps satellite in administration Water superficiality And the subterranean.

4. Program accreditation

No (program accreditation application submitted)

5. Other external influences

1. Family problems faced by students negatively affect their performance in the academic program
2. Extracurricular activities help students achieve greater accomplishments in implementing the academic program
3. The economic situation of students and their involvement in jobs to earn money negatively affects their academic performance
4. The student's academic competence from his preparatory studies is one of the most important indicators of excellence in the performance of the academic program

6. Program structure

Program structure	Number of courses	Study unit	Percentage	* comments
Institution (university) requirements	10	18	16.8	Core course
College requirements	25	75	70.1	Essential and non-essential
Department requirements	52		63.41	Essential and non-essential
Summer training				
Other				

.The notes may include whether the course is core or elective *

7. Program Description				
Year / Level	Course code	Course name	Credit Hours	
			theoreti cal	practical
Level One	NTU100	Democracy and human rights	2	0
	NTU101	English language	2	0
	TAMO100	General Chemistry	2	3
	DES100	general plant	2	3
	DES101	Soil foundations	2	3
	DES102	forests	2	3
	NTU102	computer	1	2
	NTU103	Arabic	2	0
	TAMO101	Occupational safety	2	0
	DES103	Plant physiology	2	3
	DES104	Soil chemistry	2	3
	DES105	Nurseries and propagation	2	3
Level Two	NTU200	Crimes of the Ba'ath regime in Iraq	2	0
	NTU201	English language (2)	2	0
	TAMO200	biochemistry	2	3
	DES200	organic farming	2	3
	DES101	Fertility and fertilization	2	3
	DES202	Geographic) Information Systems (GIS	2	2
	NTU202	Computer (2)	1	1
	NTU203	Arabic	2	0
	DES203	Soil physics	2	3
	DES204	Water management	2	3
	DES205	Fruit production in desert areas	2	3
Level Three	TAMO300	Area and engineering drawing	1	3
	DES300	tissue culture	2	3
	DES301	Vegetable production		

	DES302	Irrigation and drainage principles	2	3
	DES303	Gardening Foundations	2	3
	TAMO301	Statistics, design and analysis of agricultural experiments	1	3
	DES304	soil conservation	2	3
	DES305	Water harvesting	2	3
	DES306	Adapted agriculture	2	3
	DES307	The relationship ,between water, soil and water	2	3
Level Four	TAMO400	Scientific research methodology	2	0
	DES400	Crop growth modeling	2	3
	DES401	Field irrigation methods	2	2
	DES402	Land reclamation	2	2
	DES403	Wind erosion prediction models	2	3
	TAMO401	Labor market skills		
	DES404	Fluid motion modeling	2	3
	DES405	Plants of arid regions	2	0
	DES406	Conservation agriculture	1	2
	DES407	Graduation research project	0	3
.All study materials are listed in detail and according to the grade level				

8. Expected learning outcomes of the program
Knowledge
The student should be able to disseminate knowledge about the causes of .1 desertification and its effects on the environment and local communities The student should be able to conduct scientific studies and research to .2 understand the phenomena related to desertification and identify the factors affecting it The student should be able to promote cooperation between academic and .3 research institutions to exchange knowledge and experiences in the field of combating desertification The student should be able to develop effective strategies to combat .4 desertification, including sustainable farming techniques and the rehabilitation of degraded lands The student should be able to organize workshops and training courses to .5 improve the efficiency of individuals and communities in dealing with desertification The student should be able to study and evaluate the impact of policies and .6 programs implemented to combat desertification and provide the necessary recommendations
Skills
The student should be able to practice different thinking skills systematically .1 and positively in diagnosing the problems and issues he faces during work and propose appropriate solutions for them The student should be able to deduce the factors that explain the phenomena .2 related to agricultural production The student should be able to design appropriate production plans and irrigation .3 projects that achieve food and water security and serve the goals of sustainable development The student should be able to understand the interrelationship between water .4 scarcity, desertification, and climate change The student should be able to use modern technologies such as Geographic .5 Information SystemsGIS and remote sensing in monitoring land and () desertification The student should be able to develop skills in managing water and soil .6 resources sustainably to reduce the risks of desertification. The student should be able to propose appropriate solutions to specialized .7 problems in the fields of soil science and water resources

Values

1. The student should be able to suggest ways to preserve the environment and water resources in the local community
2. The student should be able to contribute to enhancing understanding and awareness of the meaning of professionalism in work and bearing legal, ethical and social responsibility
3. The student should be able to deal efficiently and effectively in the field of work to transfer knowledge and skills to farmers and the general public
4. The student must be able to take responsibility for completing the work efficiently and adhere to professional ethics
5. The student should be able to evaluate ethical issues using critical thinking skills

9. Teaching and learning strategies

The program employs a range of modern methods aimed at fostering a deep understanding of scientific concepts and developing students' practical skills. These strategies include

1. Traditional theoretical education
2. brainstorming
3. Dialogue and discussion
4. Practical and applied education
5. Collaborative learning
6. Technology-based learning

10. Assessment methods

- Oral tests
- Exams .Daily
- Practical exams
- Exams .Quarterly
- Final exams
- Projects .The process

11. Faculty						
,Faculty members (list all faculty members in the academic department (including outgoing and incoming lecturers						
Scientific rank	Specialization		Special requirements/s kills (if any)		Faculty preparation	
	general	private			angel	lecturer
teacher	Gardening and Landscape Architecture	Gardening and Landscape Architecture			angel	
teacher	Gardening and Landscape Architecture	Gardening and Landscape Architecture			angel	
teacher	Gardening and Landscape Architecture	Gardening and Landscape Architecture			angel	
teacher					angel	
Assistant teacher	Forestry science	Forestry science			angel	
Assistant teacher	Soil and water resources	Soil and water resources			angel	

Assistant teacher	computer	computer			angel	
Assistant teacher	Plant production techniques	plant production			angel	

Professional Development
Orienting new faculty members
• Developing skills to enhance self-confidence, positive orientation towards a culture of quality, requirements, and distribution of a sense of responsibility, belief in the spirit of teamwork and its role in achievement, and development of job sense and moral conscience • Evaluate the courses and plans in coordination with the academic departments to ensure they meet the requirements of the labor market • Developing student guidance and counseling skills • Providing a structured orientation program that explains to new members the academic and administrative systems of the institution • Informing them of department or college policies, such as teaching research and evaluation requirements • Assigning a mentor from among the most experienced faculty members to provide them with guidance and support on a personal and professional level
Professional development of faculty members
• Developing educational skills through diversifying teaching methods, positively engaging with feedback and its practices, using educational technologies, and focusing on developing intellectual and competitive skills among students • Developing skills in dealing with problems and phenomena that affect the educational process in the college • Professional development for new faculty members is essential to ensuring the quality of education and enhancing their skills in teaching and academic research

12. Admission standard

- Students are admitted to the college program centrally through the Central Admissions Department at the Ministry of Higher Education and Scientific Research, and according to the application channels approved by the ministry
- Students are distributed into the department's program according to their GPA and the student's preference
- To be physically and mentally fit according to the medical examination report
- The applicant's grade point average is based on the minimum grade point averages approved by the Ministry

13. Key sources of information about the program

- The primary source of program information is the expert committee of the corresponding departments of the Department of Soil Science and Water Resources and the Department of Environment and Water Resources, which is accredited as a scientific body by the Deans Committee of the Agricultural Technical College
- The study, prepared by the Scientific Committee and the Department Council and approved by the College Council, includes proposals to modernize agricultural specializations and emulate the most important corresponding scientific departments globally
- The needs of the local and regional market

14. Program development plan

A plan was developed to improve the program after studying the internal review observations by the faculty, quality assurance committees, the department's scientific committee, the department council, the program's external review, student feedback through the analysis of student questionnaires for courses academic advisors' feedback, analysis of questionnaire data from the college's questionnaire committee, and reports evaluating exam questions for all program courses, as follows

- Inadequate summer training
- The lack of a clear mechanism to help struggling students and motivate high achievers

- Students' lack of familiarity with university regulations governing the .educational process
- The success rates of some courses do not conform to the normal .distribution scheme



Program Skills Plan															
				Learning outcomes required from the program											
Year / Level	Course code	Course Name	Essential or optional	Knowledge				Skills				Values			
				A1	A2	A3	A4	B1	B2	B3	B4	Part 1	Part 2	Part 3	Part 4
Level One	NTU 100	Human rights and democracy	assistant			√		√				√			
	NTU 101	English language (1)	assistant		√					√		√			
	NTU 102	Computer (1)	assistant			√				√			√		
	NTU 103	Arabic language (1)	assistant	√					√					√	
	NTU	elective	assistant	√					√			√			
	TAMO101	mathematics	assistant			√		√					√		
	TAMO 102	engineering drawing	assistant	√				√				√			

	TAMO 103	flat area	assistant	√			√			√				
	TAMO 104	General Chemistry	essential	√			√					√		
	TAMO	elective	optional		√				√			√		
	DES 101	Soil principles	essential	√			√			√				
	DES 102	Soil physics	essential	√			√					√		
	DES 103	forests	essential	√			√					√		
	DES 104	Arid climate	essential			√			√		√			
	DES 105	Soil chemistry	essential	√			√					√		
	NTU104	sports	optional		√		√				√			
	TAMO151	Water resources economics	optional	√					√				√	
	TAMO152	Agricultural guidance	optional		√		√					√		
	DES151	general plant	optional	√			√				√			

	DES152	Principles of Animal Production	optional	√				√				√	
	DES153	Plant physiology	optional	√			√			√			
	DES154	field crops	optional	√			√						
	DES155	geologic	optional	√			√			√			
	DES156	Soil management	optional	√			√				√		
Level Two	NTU 200	English language (2)	assistant	√			√			√			
	NTU 201	Computer (2)	assistant	√			√				√		
	NTU 202	Arabic language (2)	assistant	√			√			√			
	NTU 203	Crimes of the Ba'ath regime in Iraq	assistant	√			√			√			

NTU 204	Professional ethics	essential	√			√				√			
TAMO 201	Organic Chemistry	essential	√			√					√		
TAMO 202	Agricultural statistics	essential		√		√				√			
TAMO	elective	optional	√					√			√		
DES 201	dry farming	essential		√				√		√			
DES 202	remote sensitization	essential		√		√				√			
DES 203	Water Management	essential	√			√					√		
DES 204	Fertility and fertilization	essential		√		√						√	
DES 205	Geomorphology	essential		√				√			√		
DES 206	Fruit production in desert areas	essential	√				√				√		

	DES 207	Summer training (1)	essential			√			√			√		
	TAMO251	agricultural nanotechnology	optional		√				√				√	
	TAMO252	Food industries	optional	√				√			√			
	DES251	Tractors and agricultural machinery	optional		√				√				√	
	DES252	Agricultural pests	optional		√				√		√			
	DES253	Nurseries and propagation	optional		√			√			√			
	DES254	fodder crops and pastures	optional	√				√				√		
	DES255	tissue culture	optional		√			√					√	

	DES256	Optimal use of soil and water	optional	√					√			√		
Level Three	TAMO 301	Calculator applications (3)	assistant	√				√				√		
	TAMO 302	biochemistry	essential		√				√			√		
	TAMO	elective	essential	√				√			√			
	DES 301	Wind erosion and ways to resist it	essential	√				√			√			
	DES 302	Desert land cultivation	essential			√			√			√		
	DES 303	Water harvesting	essential	√				√			√			
	DES 304	soil conservation	essential			√			√			√		
	DES 305	Irrigation and drainage principles	essential	√				√			√			

DES 306	Groundwater management	essential			√		√				√		
DES 307	Sustainable development in desert regions	essential		√			√			√			
DES 308	Summer training (2)		√				√				√		
TAMO351	Recycling agricultural waste	optional	√				√					√	
TAMO352	organic farming	optional	√				√				√		
DES351	gardening	optional	√				√				√		
DES352	Adapted agriculture	optional	√				√				√		
DES353	wild animals	optional	√				√					√	
DES354	Dryland communities	optional	√				√				√		

	DES355	Nature reserves	optional	√				√				√		
	DES356	The relationship between soil, water and plants	optional		√			√					√	
	DES357	Water reuse	optional	√				√				√		
	DES358	Desert Land Management	optional		√			√						
Level Four	NTU 400	Scientific research methodology	assistant		√			√					√	
	TAMO 401	Design and analysis of experiments	essential	√				√				√		
	TAMO 402	Calculator applications (4)	assistant		√			√			√			

	TAMO	elective	essential	√					√				√	
	DES 401	Crop growth modeling	essential			√		√			√			
	DES 402	Field irrigation methods	essential	√				√				√		
	DES 403	Land reclamation	essential		√			√						
	DES 404	Wind erosion prediction models	essential		√			√					√	
	DES 405	Fluid motion modeling	essential			√			√			√		
	DES 406	Plants of arid regions	essential		√			√			√			
	DES 407	project	essential		√			√				√		
	DES 408	seminars	essential	√				√					√	

	TAMO451	Occupational safety	optional	√				√				√		
	TAMO452	Agricultural marketing	optional	√				√				√		
	DES451	Dryland facilities	optional	√				√				√		
	DES452	Conservation agriculture	optional	√				√					√	
	DES453	dryland pastures	optional	√				√				√		
	DES454	Database management	optional	√				√				√		
	DES455	Geographic Information Systems (GIS)	optional	√				√				√		

. Please check the boxes corresponding to the individual learning outcomes from the program that are subject to assessment

Course description template

1. :Course name	
Democracy and human rights	
2. Course code:	
NTU100	
3. semester / year	
the first	
4. Date of preparation of description	
2024/9/1	
5. Available forms of attendance	
6. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
7. Name of the course coordinator (list all names, if there is more than one)	
Name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq	
8. Course objectives	
Goals	1. The student should be able to understand and comprehend matters related to human rights, their .types, and human rights in the Abrahamic religions 2. The student should be able to identify the types of human rights according to the Iraqi Constitution of 2005 . 3. The student should be able to identify the different .types of governments 4. The student should be able to identify democratic and dictatorial governments, and understand the concepts .of freedom and human rights
9. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills

10. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	The student should understand : A3 Knowledge and Understanding : B1 Intellectual Skills B2 : Practical Skills Q1 : Values and Attitudes	Human rights: their definition and objectives	The discussion method and the lecture method	Short quizzes , homework assignments , discussions
the second	2 Theory	The student should be able to: A3 . Defines the roots of human rights B1 . It reviews the most important historical milestones that contributed to the development of the concept of human rights throughout the ages. .Part 1 Explains how the concepts ,of justice freedom, and equality were expressed in	The roots and development of human rights throughout human history. Human rights in .ancient times	Discussion ,method lecture method	Short quizzes , homework assignments , discussions

		ancient .civilizations . A3 Recognizes old documents and principles			
the third	2 Theory	A1: That the student understands The concept of human rights as it appeared in pre-Christian civilizations. He learns about the most important ancient laws that dealt with .rights B1 : Explains how justice and rights were practiced in the civilization of Mesopotamia. Explain how divine laws addressed the concept of rights and justice. Learn about human rights in Islam	Human rights in ancient civilizations, especially Mesopotamian civilization	Discussion ,method lecture method	Short quizzes , homew ork assign ,ments discussi ons
Fourth	2 Theory	The student should become familiar with -: A3. The nature of society in the Middle Ages In Europe, the ,Islamic world	divine laws , with a focus on human rights in Islam	Discussion ,method lecture method	Short quizzes , homew ork

		(and elsewhere and its impact on the concept of rights. B1 . Explains how human rights were affected by feudal systems . A3 . He identifies the important documents that appeared at that time B1. It determines an individual's status and social class and their relationship to their rights			assign ,ments discussions
Fifth	2 Theory	B1 : The student should learn how the idea of human rights developed within political and intellectual theories and distinguish between the positions of political doctrines on individual and collective rights. It explores the role of philosophers and thinkers in shaping the	Human rights in the Middle Ages. Human rights in political doctrines, schools of thought, and theories Human rights in corporations, their declarations, revolutions .and constitutions	Discussion ,method lecture method	Short quizzes , homework assign ,ments discussions

		modern concept of human rights. He compares the different political doctrines in their view of human rights.			
Sixth	2 Theory	:A3 It identifies the most important historical milestones in the international recognition of human rights after World War II. Explains : B1 the role of international organizations(the United Nations, the Council of Europe, the African Union, the League of Arab States) in formulating and protecting rights. Explains :Q1 the principles of major international charters and treaties It reviews : B1 international and regional monitoring mechanisms	Human Rights in Contemporary and :Modern History International Recognition of Human Rights	Discussion ,method lecture method	Short quizzes , homework ork assignments ,ments discussions

		for the implementation of human .rights			
Seventh	2 Theory	A3: That the student recognizes on -: The concept of international and regional recognition of human rights and the motives for its emergence after global wars and conflicts. Learn about the most important international agreements and conventions	International and regional recognition of human rights	Discussion ,method lecture method	Short quizzes , homework ork assign ,ments discussi ons
Eighth	2 Theory	The :A3 student should define the concept of non-governmental .organizations And its role in civil society. : B1 Distinguish between the types of non-governmental organizations(,local, national (international working in the field of human rights. To :A3 identify the	NGOs and Human Rights	Discussion ,method lecture method	Short quizzes , homework ork assign ,ments discussi ons

		most prominent international organizations defending human rights			
Ninth	2 Theory	B1 : The student should be able to understand what these organizations are and what their role is in society. They should also be able to distinguish between national organizations and international organizations working in the same field .Furthermore they should understand that these institutions ,monitor rights investigate violations, and report on the state of human rights.	National human rights organizations	Discussion ,method lecture method	Short quizzes , homework assignments discussions
tenth	2 Theory	A3: The student will learn about the fundamental rights guaranteed by the Iraqi Constitution. They will understand the	Human rights in Iraqi constitutions: between reality and theory	Discussion ,method lecture method	Short quizzes , homework assignments

		difference between the rights theoretically stipulated in the Constitution and their actual application in daily life. They will learn about the challenges facing the protection of human rights in Iraq in practice.			,ments discussi ons
eleventh	2 Theory	A3: The student will learn about the concept of human rights and fundamental freedoms as outlined in the Universal Declaration of Human Rights . They will understand how rights and freedoms integrate to form a system that protects human beings and their dignity. They will learn about key fundamental freedoms such	The relationship between human rights and public freedoms in the Universal Declaration of Human Rights	Discussion ,method lecture method	Short quizzes , homew ork assign ,ments discussi ons

		as freedom of ,expression freedom of religion, and freedom of movement.			
twelfth	2 Theory	A3: The student will learn about the concept of human rights and fundamental freedoms as outlined in regional conventions such as the European Convention on Human Rights, the African Charter on Human and 'Peoples Rights, and others. They will understand how national constitutions regulate and guarantee fundamental freedoms as core human rights. They will identify the similarities and differences between regional conventions and national	The relationship between human rights and public freedoms in regional charters and national constitutions	Discussion ,method lecture method	Short quizzes , homework assignments discussions

		constitutions in protecting rights and freedoms.			
thirteenth	2 Theory	B1 : The student should analyze the importance of human rights in ensuring human survival and dignity. They should compare individual and collective rights in terms of their application and challenges . They should discuss how collective rights defend ,identity culture, and diversity.	Essential human rights and collective human rights	Discussion ,method lecture method	Short quizzes , homework assignments ,discussions
fourteenth	2 Theory	A3: The student will be able to understand the concept of ,economic social, and cultural human rights, such as the right to ,work ,education health, and adequate housing; understand the concept of civil and	Economic, social, and cultural human rights, and civil and political human rights	Discussion ,method lecture method	Short quizzes , homework assignments ,discussions

		political ,human rights such as the right to ,freedom ,expression political ,participation and justice; and recognize the fundamental differences between ,economic social, and cultural rights and civil and political rights .			
fifteenth	2 Theory	A1: The student should understand contemporary human rights and the importance of integrating them with the Sustainable Development Goals.	:Modern human rights facts on development, and the right to a clean environment	Discussion ,method lecture method	Short quizzes , homework ork assignments discussions
11. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
12.Learning and teaching resources					
Required textbooks ,curriculum books) (if available		Studies in Democracy and Human Rights Author: Hadi Rabie Publisher: Dar Al-Jinan for Publishing and Distribution - 2016			
Main references (sources)		- “Democracy and Human Rights: Concepts, Measures and Relationships” .By DrTodd Landman ,			

	published in 2018, it addresses the concepts of democracy and human rights, how to measure them, and analyzes the relationships between .them
Recommended books and references (scientific journals and (...reports	The International Journal of Human Rights It publishes research on human rights issues around the world and .international politics
Electronic references and websites	https://www.ohchr.org https://www.amnesty.org https://www.hrw.org



Course description template

13.:Course name	
English language (1)	
14. Course code:	
NTU101	
15. semester / year	
16. Date of preparation of description	
2024/9/1	
17. Available forms of attendance	
1. Weekly lesson schedule (theory) .(2. Discussions, scientific seminars, and other extracurricular activities	
18. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
19.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq	
20. Course objectives	
Goals	1. The student should be able to recognize all the skills and .knowledge of the English language 2. The student should be able to encourage and develop scientific . research in the fields of English language in general 3. The student should be able to cooperate with local and international organizations in the field of English language .development
21.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills
22. Course structure	

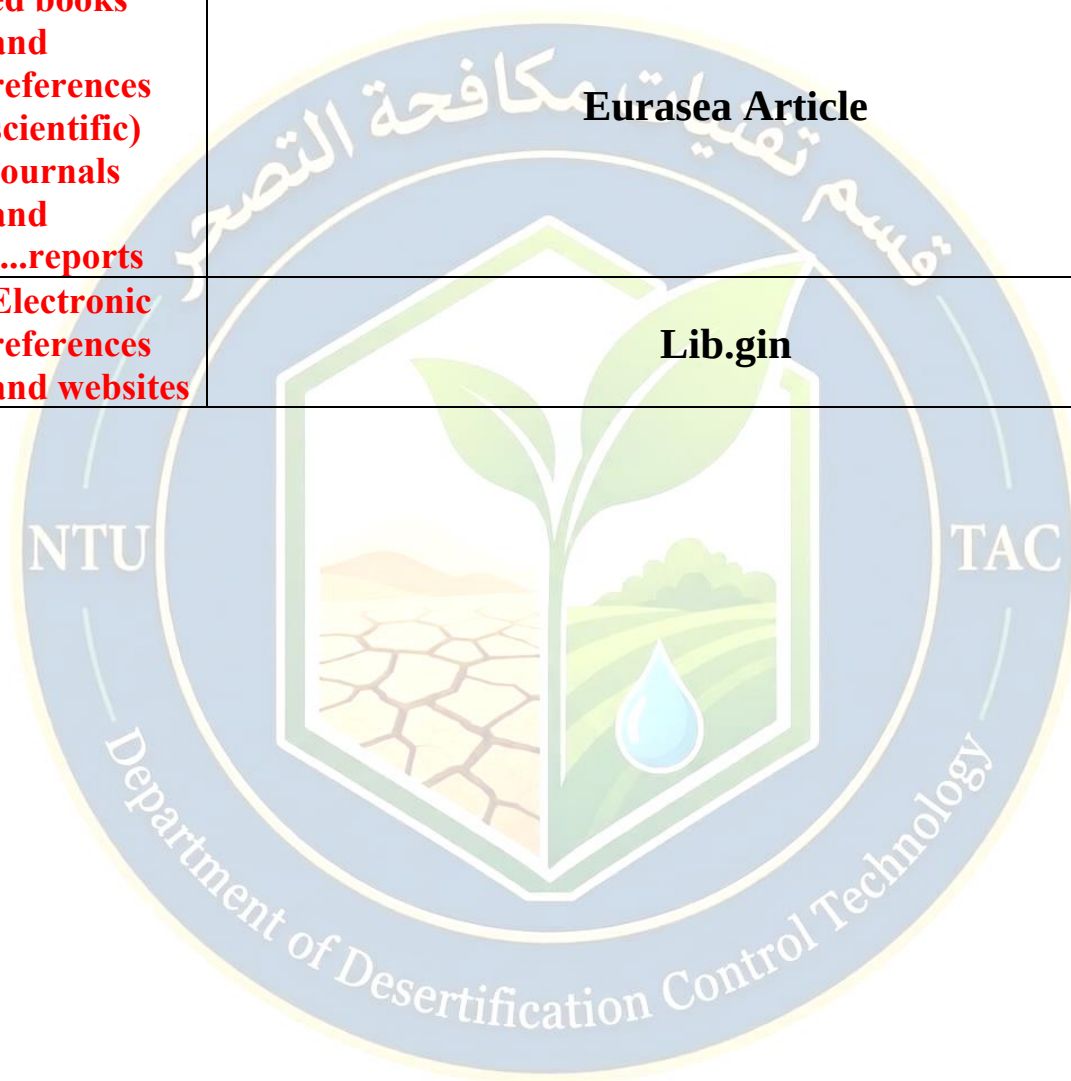
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A2: Theoretical To be able to understand agricultural scientific terminology in English In all agricultural disciplines	:Theoretical Scientific terminology in the field of agriculture	The discussion method and the lecture method	Short ,quizzes homework k assignme ,nts discussio ns
the second	2 Theory	A2: Theoretical To be able to understand the scientific terminology in the field of plant . production	theoretical : Scientific terms in the field of plant production	Discussion ,method lecture method	Short ,quizzes homework k assignme ,nts discussio ns
the third	2 Theory	A2: Theoretical To be able to understand the scientific terminology in the field Animal production	theoretical : Scientific terms in the field of animal production	Discussion ,method lecture method	Short ,quizzes homework k assignme ,nts discussio ns

Fourth	2 Theory	:A2: Theoretical To be able to understand the scientific terminology in the field protection plant	: theoretical Terminology Scientific in area protection plant	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
Fifth	2 Theory	monthly exam	monthly exam	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
Sixth	2 Theory	B2 / Theory : To be able to understand the scientific terminology in the field Food science	theoretical : Scientific terms in the field of food science	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
Seventh	2 Theory	monthly exam	monthly exam	Discussion ,method lecture method	Short ,quizzes homework

					assignments discussions
Eighth	2 Theory	Part Theoretical: To/1 be able to understand scientific terminology in the field of agricultural economic and social sciences	theoretical: Scientific terms in the field of agricultural economic and social sciences	Discussion method lecture method	Short quizzes homework assignments discussions
Ninth	2 Theory	B2 / Theory: To be able to understand the scientific terminology in the field of agricultural biotechnology	theoretical: Scientific terms in the field of agricultural biotechnology	Discussion method lecture method	Short quizzes homework assignments discussions
tenth	2 Theory	:A2/ Theoretical To be able to understand the scientific terminology in the field of soil sciences	theoretical: Scientific terms in the field of land and water	Discussion method lecture method	Short quizzes homework assignments discussions

eleven th	2 Theory	monthly exam	monthly exam	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
twelfth	2 Theory	B2 / To be able to know the scientific terminology in the field of agricultural .engineering	theoretical: Scientific terms in the field of agricultural engineering	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
thirtee nth					
fourtee nth	2 Theory	A1/ To be able to know the scientific terminology in the field of agricultural .engineering A review of all the English language lectures the student received during .the academic year	theoretical: Scientific terms in the field of agricultural engineering theoretical: Article review	Discussion ,method lecture method	Short ,quizzes homework assignments discussions
fifteen th					
23. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
24.Learning and teaching resources					
Required) textbooks		Rapid Review			

curriculum books, if (available)	
Main references (sources)	English Grammar
Recommended books and references scientific journals and (...reports)	Eurasea Article
Electronic references and websites	Lib.gin



Course description template

25.:Course name	
Computer Principles (1)	
26. Course code:	
NTU102	
27. semester / year	
28. Date of preparation of description	
2024/9/1	
29. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
30. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 1 practical)* 15 weeks 30	
31.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Manhal Muhammad Bashir	
:e-mail manhalbasher@ntu.edu.iq	
32. Course objectives	
Goals	- The student should be able to identify the calculator – calculator generations – hardware components and software - The student should be able to identify the most ,important basic information about computers .computer generations, and operating systems - The student should be able to identifythe MS-DOS operating system , the concept of the system, the system signal, disks, directories and their levels, their files, internal and external .commands
33.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills

34.Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	1 Theory 1. Practical	B3 / The importance of computers in our daily lives and economy Knowledge of information technology and identification of computer parts and components	Introduction to computers / Computer systems / Information technology / Types of computers / Input units / Processing unit Central /Output Units	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework assignments discussions
the second	1 Theory 1. Practical	A3/ Identifying computer hardware and memory types	memory Main topics and their types / Data / storage in memory Factors affecting computer performance	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework assignments discussions
the third	1 Theory 1. Practical	A3/ Learn how data is represented, the units of measurement used, and learn about software programs and software compilers, and	Definition and types of software / Systems software : Operating / systems Programming languages and programming systems . Software Applied /	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework assignments discussions

		types of operating .systems		Practical : Assigning tasks and reporting	
Fourth	1 Theory 1. Practical	B3 / The student must be able to recognize the system Windows And learn about window movement and .how to control it	Introduction to Windows Its / advantages / Starting / the computer Shutting down the computer / Using the / mouse Windows screen components : Taskbar: Icons: and their types (standard) (and the general .public)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	1 Theory 1. Practical	A3/ The student should be able to identify How to use the control panel and how to make the necessary adjustments to it	/ Control Panel / Desktop Controls / Screen Saver Window Colors and Fonts / Display Settings / Adjust / Screen Colors Adjust Time and Date Volume / Switch / / Mouse Buttons Double-Click Speed Control / Change / Mouse Pointer Control Mouse Speed Install and Uninstall / Programs	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	1 Theory 1. Practical	A3/ The student should be able to know how to operate applications and programs	Minimize and / maximize window / Close permanently / Close temporarily / Move window / Control window size Methods for running applications and programs	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				Practical : Assigning tasks and reporting	
Seventh	1 Theory 1. Practical	B3 / The student must be able to Learn how to sort theStart menu and delete and .add items from it	SortStart menu items Delete /Start menu items Add a / submenu to theStart menus Add a new button to theStart menu	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	1 Theory 1. Practical	A3/ The student must be able to Understanding basic information about the operating system and how to use it	Basic system / information Disabling unwanted applications	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	1 Theory 1. Practical	B3 / The student must be able to Understanding primary and secondary icons in the operating system	Windows Explorer / My Computer / icon My Computer window sections	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
tenth	1 Theory 1. Practical	A3/ The student must be able to Understanding how to access the Recycle Bin, how to retrieve files from it, and how to work with .them	,Recycle Bin (Delete Restore, and Empty / (the BinMy Documents Icon	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	1 Theory 1. Practical	A3/ The student must be able to Defining files and folders and how to display file or folder properties	Defining files and folders / Specifying files and folders / File and folder properties	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	1 Theory 1. Practical	B3 / The student should be able to create and delete files, change the ,name of each file or create a shortcut to the .application or file	Create files and folders / Rename files and folders / Move a file or folder / Copy a file or folder / Search / for a file or folder Create a shortcut icon for an application or file	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	1 Theory 1. Practical	B3 / The student must be able to Use the calculator and the notes or .drawing icon	/ Calculator / Notepad Notebook / Using the notepad to edit and create the file Painter / Screen Components	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	1 Theory 1. Practical	B3 / The student should be able to create, save, and use drawings as desktop backgrounds	/ Creating graphics Setting foreground / colors Background / Choose brush size / Select drawing tool Save drawing / Set drawing as desktop background / Exit Paint (Entertainment ProgramsMedia player	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	1 Theory 1. Practical	A3/ The student should be able to identify the types of computer viruses, the symptoms of ,virus infection and how to protect against .them	Viruses / Reason for the name / Definition Ways of virus / / transmission Symptoms of virus infection / Methods of protection / Types of viruses / Computer crimes Theft / Hackers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical : Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
35. Course evaluation					

The distribution of marks out of 100 is based on the tasks assigned to the student, such as daily preparation, daily oral tests, monthly or written tests reports, etc	
36.Learning and teaching resources	
Required textbooks curriculum books, if (available)	Lectures prepared by the course instructor
Main references (sources)	Metzeelaer and Scharpf /Benjamin/Cummings Pub. 1995
Recommended books and references (scientific (...journals and reports	Library, scientific websites, access to lectures from other universities
Electronic references and websites	



Course description template

37.:Course name	
Arabic language	
38. Course code:	
NTU103	
39. semester / year	
40. Date of preparation of description	
2024/9/1	
41. Available forms of attendance	
1. Weekly lesson schedule (theory) .(2. Discussions, scientific seminars, and other extracurricular activities	
42. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
43.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Amna Maher Aziz :e-mail amina.mahir@ntu.edu.iq	
44. Course objectives	
Goals	1. The student should be able to read correctly. 2. The student is able to write correctly and use punctuation . marks properly 3. The student should be able to acquire the ability to use the . Arabic language correctly 4. The student should be able to separate elements from their .groups or mixtures 5. The student should be able to pronounce correct Arabic .words, structures, and styles in an engaging manner 6. To accustom the student to expressing his ideas clearly .and correctly
45.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills

46.Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1. Identifying the types of .linguistic errors . B2 Differentiating between the open and closed taa	Introduction to linguistic errors – the closed and open taa	The discussion method and the lecture method	Short ,quizzes homework ,assignments discussions
the second	2 Theory	. B2 Differentiating between writing the long alif and the short alif, and the positions for .writing both alifs . B2 Differentiating between solar and lunar letters	Rules for writing the – long and short alif solar and lunar letters	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
the third	2 Theory	/A1 Differentiating between and	The letters and	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	B2 / Enabling the student to write the hamza correctly	Writing the hamza	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory	A1/Recognizing punctuation marks And	punctuation marks	Discussion ,method	Short ,quizzes

		writing it in its correct place		lecture method	homework ,assignments discussions
Sixth	2 Theory	A1. Identifying nouns and verbs and stating the sign of each . B2 Differentiating between nouns and verbs B2 . Explanation of the types of verbs . B2 Differentiating between types of verbs	Noun and verb, and the difference between them	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1/ Identifying the types of objects and differentiating between them	Objects	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	B2 / Enabling the student to write numbers correctly	number	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A1/ Identifying Common linguistic errors and how to avoid them	Applications for common grammatical errors	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions

tenth	2 Theory	A1/ Identifying Common linguistic errors and how to avoid them	Applications for common grammatical errors	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	/ B2 Differentiating between Noon and Tanween A1/ Identifying the meanings of prepositions	The letters Nun and Tanween - Meanings of Prepositions	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	A1/ Identifying Formal aspects of administrative discourse	Formal aspects of administrative discourse	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
thirteen th	2 Theory	/A1 Understanding the language of administrative discourse	Administrative discourse language	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
fourteen th	2 Theory	/A1 Understanding the language of administrative discourse	Administrative discourse language	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions

fifteenth	2 Theory	A1/ Identifying examples of administrative correspondence	Models From administrative correspondence	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
47. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
48.Learning and teaching resources					
Required textbooks curriculum) books, (available		:Required books General Arabic Language Curriculum for Technical Dr. Safaa Kadhim Makki and Dr. Lama by) Universities (Muhammad Younis			
Main references (sources)		1- Clear Dictation: Abdul Majeed Al-Nuaimi, Daham Al-Kayyal, Dar Al-Mutanabbi Library, Baghdad, 6th edition .AD 1987 2- Lessons in language, grammar and spelling for state employees: Ismail Hamoud Atwan and others, Ministry of .Education Press No. (3), Baghdad, 2nd edition, 1984 AD 3- :Arabic Language for the Third Intermediate Grade .Fatima Nazim Al-Atabi, and others, 1st Edition, 2018 AD 4- General Arabic Language for Non-Specialized Departments: Abdul Qadir Hassan Amin and others, Ministry ,of Higher Education and Scientific Research, 2nd Edition .AD 2000 Inspired by Arabic literature: Hawal Muhammad Amin, .Saadoun Press, Baghdad			
Recommended books and references scientific) journals and (...reports		Lessons in language, grammar and spelling for state employees, Ismail Hamoud Atwan and others, Ministry of Education Press No. (3) Baghdad, 2nd .edition, 1984 AD			



Course description template

49.:Course name	
mathematics	
50. Course code:	
TAMO101	
51. semester / year	
52. Date of preparation of description	
2025/9/1	
53. Available forms of attendance	
54. Number of credit hours (total) / Number of units (total)	
hours (1 theory)* 15 weeks 15	
55.Name of the course coordinator (list all names, if there is more than one)	
:the name	
:e-mail	
56. Course objectives	
Goals	1. The student should be able to recognize the most .important basic information about mathematics 2. The student should be able to solve mathematical .problems 3. The student should be able to solve trigonometric .functions 4. The student should have a complete understanding of .calculus 5. .The student should be able to solve logarithmic functions
57.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills
58.Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	1 Theory	B1 / The student understands the concept of a function as a relationship that connects two or more variables in an organized way A3/ That the student becomes familiar with Basic function :components, such as The domain, range, and rule of the function B1 / The student should be able to differentiate between the different types of ,functions (linear ,quadratic, fractional exponential, and .(logarithmic A2/ The student should be able to identify how to represent functions graphically using .coordinates Q2/ The student should analyze the properties of functions in terms of ,increasing, decreasing symmetry, and extreme .behavior	:Theory Functions	Theoretical :cal Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignments ,ts discussion s
the second	1 Theory	B1 / The student should understand the concept of differentiation as a mathematical tool for measuring the instantaneous rate of	Theoretical : Derivative of algebraic functions	Theoretical :cal Auditory :methods the method of	Short ,quizzes homework assignments ,ts

		change of a function at . a specific point A1/ The student should be able to identify the properties of algebraic functions . that can be derived The student should be able to distinguish between the different types of algebraic functions and their various terms when . applying differentiation The student should apply the basic rules ,of differentiation : such as • Derivative of the constant • Derived power • multiplication rule • division rule The student should solve mathematical problems that require the use of differentiation rules to find the first . derivatives Q2/ The student should use the derivative to explain instantaneous changes in life and scientific contexts (such as speed, growth, or . (decline		writing on the ,board the method of direct dialogue	discussion s
the third	1 Theory	B1 / The student should understand the concept of integration as a mathematical tool for finding the original	Theoretical : Integration of	Theoreti :cal Auditory :methods the	Short ,quizzes homework assignment

		function or calculating . the areas under curves A3/ The student should recognize the relationship between integration and differentiation as two . inverse processes B1 / The student should be able to distinguish between the types of algebraic functions that can be integrated ,polynomial) . (rational, radical The student should be able to apply the basic rules of integration to different types of . algebraic functions A2/ The student should solve mathematical problems involving calculation Indefinite and definite integrals . B1 / The student should use integration to solve applied problems in fields such as engineering, physics, and . economics The student should connect integration with understanding quantitative changes through spatial representation and . mathematical modeling	algebraic functions	method of writing on the ,board the method of direct dialogue	,ts discussion s
Fourth	1 Theory	B1 / The student should understand the concept of the logarithmic function as a non-algebraic function used	:theoretical Non-algebraic :functions	Theoreti :cal Auditory :methods	Short ,quizzes homework assignmen

		in modeling phenomena .with relative change A2/ The student should become familiar with The properties of the general and natural ,logarithmic function and its graphical .representation B1 / The student should be able to distinguish between the different forms of the ,logarithmic function ,and identify its domain range and extreme .behavior B1 / The student should apply the rules Differentiation is used to calculate the derivatives of logarithmic .functions B1 / That the student uses The chain rule in deriving compound expressions containing .logarithmic functions B1 / The student should be able to solve mathematical problems involving logarithmic functions in applied .contexts	The logarithmic - function the derivative of the logarithmic function	the method of writing on the ,board the method of direct dialogue	,ts discussion s
Fifth	1 Theory	B1 / The student should understand the concept of the integration of the	:theoretical Exponentia :l function	Theoreti :cal Auditory	Short ,quizzes homework

		logarithmic function and its importance in mathematical and scientific applications The student should be able to identify the indefinite integral of a function $\ln(x)$. B1 / The student should apply appropriate integration techniques to solve integrals containing logarithmic functions : such as Compensation method Partial integration method B1 / The student should solve problems involving complex logarithmic expressions that require the integration of more than one integration technique B1 / The student should connect the skills of logarithmic integration Applications in fields ,such as physics engineering, and . economics A2/ The student should explain the results of integration in real-life and scientific contexts, such	Derivative of the exponential function	:methods the method of writing on the board the method of direct dialogue	assignments, discussions
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		as exponential growth and . logarithmic regression			
Sixth	1 Theory	A2/ The student should be able to identify the natural exponential function e^{ax} and general .exponential functions a^{bx} and the , .characteristics of each B1 / That the student distinguishes between Graphical representations and extreme behavior of different exponential .functions B1 / The student should apply the rules Derivation of simple and complex exponential .functions B1 / That the student uses a base The series is for deriving expressions that contain compound .exponential functions B1 / The student should solve problems Applied studies involving exponential changes in fields such ,as physics, biology economics, and .engineering	Theoretical : Derivative of exponential functions - Derivative of logarithmic functions	Theoretical :cal Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignments ,ts discussion s

		B1 / The student should explain the results Differentiation in life and scientific contexts to understand rapid changes and dynamic .patterns			
Seventh	1 Theory	B1 / The student should understand the concept of integration for ,exponential functions Its importance lies in mathematical modeling and practical applications A2/ The student should be familiar with the rule of indefinite integration of the natural exponential function e^x	Integral of the exponential function	Theoretical Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignments ,ts discussions
Eighth	1 Theory	Assessing student understanding	First semester exam	Written exam	Written exam
Ninth	1 Theory	B1 / The student should understand the importance of the integration of trigonometric functions in the mathematical modeling of periodic phenomena in natural and .engineering sciences A2/ The student should become familiar with	:theoretical Trigonometric :functions Derivative of trigonometric ,functions Integral of trigonometric	Theoretical Auditory :methods the method of writing on the ,board the method	Short ,quizzes homework assignments ,ts discussions

		Basic rules for integrating trigonometric functions :include $\sin(x) \backslash \sin(x)$ $\square$ $\sin(x)$ $\cos(x) \backslash \cos(x)$ $\cos(x)$ $\tan(x) \backslash \tan(x)$ and others, $\tan(x)$ B1 / The student should apply appropriate integration methods, such :as Direct integration Compensation method B1 / That the student uses Trigonometric transformations (such as (trigonometric identities are used to simplify integral expressions involving powers or .compound angles A2/ The student should solve problems An application involving trigonometric functions ,related to waves vibrations, and periodic .motion B1 / That the student should connect Mathematical skills in trigonometric integration and their practical applications in fields such	ric functions	of direct dialogue	
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		,as engineering, physics and acoustics A2/ The student should explain the results Integration in the context of periodic phenomena such as currents Alternating electricity or simple harmonic motion			
tenth	1 Theory	B1 / that understand student concept Functions Implicit, and reasons Using it when no be Relations between Variables in image Frank A2/ An recognizes student on steps differentiation implicit and extraction Derivatives implicit from Relationships Sports not Frank B1 / that Applies student Technologies differentiation implicit in Introduction integration For relationships not midwife For the solution The frank one A2/ that Used student Ways compensation To simplify and integration expressions that Contains on Dual Implicit B1 /An Solves student Issues integration It includes Relationships implicit between Variables in Contexts Engineering or Physical A2/ That connects student between integration implicit and modeling realism that Requires Dealing with variables	Integration of implicit functions	Theoreti :cal Auditory :methods the method of writing on the board the method of direct dialogue	Short ,quizzes homework assignmen ,ts discussion s

		interconnected In a way . not direct A2/ That Explains student results integration implicit in Applications like a movement bodies in Paths not Line or Systems Physical The . complex one			
elev th	1 Theory	B1 / The student should understand the concept of implicit differentiation as a tool for deriving derivatives when the relationship between variables is not expressed in an . explicit form A2/ The student should be able to identify the basic steps for deriving implicit equations using . the chain rule B1 / The student should use the chain rule accurately when dealing with derivatives in ,implicit equations especially when there are . compound expressions A2/ The student should solve mathematical problems that contain implicit relationships between variables in theoretical and applied . contexts B2 / The student should link implicit differentiation to its	:theoretical Differentiat ion of implicit functions	Theoreti :cal Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignmen ,ts discussion s

		practical applications in ,the fields of engineering physics, and natural . sciences A2/ The student should be able to interpret the results of implicit differentiation within contexts that require dealing with non-linear equations or complex . interrelated relationships			
twelfth	1 Theory	B1 / The student should apply the method of integration by parts to problems involving the product of functions ,Such as polynomials) ,logarithmic trigonometric, and . (exponential A2/ The student should solve complex integrals that require more than one step using repeated . parts integration B1 / The student should explain the results of integration in applied contexts in the fields of mathematics, physics, and . engineering A2/ The student should develop analytical and strategic skills in selecting integration components to simplify . complex expressions	Theory Integration - Methods Partial Fraction Integration	Theoretical Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignment ,ts discussion s

thirteenth	1 Theory	Assessing student understanding	Second semester exam	Written exam	Written exam
fourteenth	1 Theory	B1 / The student should understand the concept Differential equations and their importance in describing changing phenomena in natural sciences and .engineering A2/ The student should be able to identify the classification of differential equations based on their order and .linearity B1 / The student should apply the basic methods of solving differential equations according to .their order and linearity The student should analyze the behavior of dynamical systems using differential .equations B1 / The student should explain the role Differential equations are used in the analysis of mathematical models and the prediction of outcomes in fields such ,as physics, economics .and biology A2/ The student should develop skills in using differential equations to solve real problems and provide practical .solutions	:theoretical Solving differential equations	Theoretical :cal Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignments ,ts discussion s

fifteen th	1 Theory	A2/ The student should understand the importance of differential equations as a mathematical tool for describing phenomena Variable in the fields of physics, engineering, and .economics A2/ The student should be able to identify the classification of differential equations according to the order of the derivative and the .type of linearity B1 / The student should apply the main solutions methods for first-order ,differential equations such as separable equations and linear .equations B1 / The student should apply the method of solving second-order differential equations with constant coefficients using the characteristic .equation A2/ The student should explain how to use general solutions The specific one is for describing the behavior of .dynamic systems A2/ The student should develop analytical skills that enable him to understand advanced mathematical models and apply them in multiple scientific and life .situations	:theoretical Solving differential equations	Theoreti :cal Auditory :methods the method of writing on the ,board the method of direct dialogue	Short ,quizzes homework assignmen ,ts discussion s
59. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
60.Learning and teaching resources	
Required textbooks curriculum books, if (available)	The prescribed vocabulary from the Ministry of Hig Education and Scientific Research
Main references (sources)	Applications in calculus Written by Dr. Salman bin Abdul Rahman Al-Salman Dr. Ibrahim Deeb Sarmini INTRODUCTION TO MATHEMATICAL ECONOMICS Third Edition EDWARD T. DOWLING, Ph.D.
Recommended books and references (scientific (...journals and reports	Google Scholarr , the scientific researcher's portal
Electronic references and websites	All sites that provide reliable sources



Course description template

61.:Course name	
engineering drawing	
62. Course code:	
TAMO102	
63. semester / year	
64. Date of preparation of description	
2024/9/1	
65. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
66. Number of credit hours (total) / Number of units (total)	
hours (3 practical)* 15 weeks 45	
67.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq	
68. Course objectives	
Goals	1. The student should be able to understand all the .geometric properties or shapes in a clear way 2. The student should be able to use the tools .required in engineering drawing correctly 3. The student should be able to apply the .fundamentals of engineering processes 4. The student should be able to deduce the projections and isometric views of each .geometric shape and identify its dimensions
69.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Field training 5. .Practical exercises 6. .The field project 7. .Self-learning

70. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	hours 3	A1/ The student will be able to understand the concepts and fundamentals of .surveying	:practical General Concepts of Surveying	:practical Assigning tasks and reporting	Short ,quizzes homework k assignme ,nts discussio ns
the second	hours 3	A1/ The student will learn how to use the ,measuring tape, chain .stake, peg, and string The plumb bob also includes the use and .maintenance of tools	practical Devices and tools used in measurement	:practical Assigning tasks and reporting	Short ,quizzes homework k assignme ,nts discussio ns
the third	hours 3	B1 / The student will learn the standard units used in surveying, types of measurement systems and their conversions	: practical Types of units of measurement and their conversions	:practical Assigning tasks and reporting	Short ,quizzes homework k assignme ,nts discussio ns

Fourth	hours 3	B1 / The student will learn how to use the drawing scale and its types, and how to extract the true dimensions from maps .using the drawing scale	:practical scale drawing	:practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
Fifth	hours 3	A1/ The student will learn Correction for difference in length strip Correction for the difference in height between two points Correcting the error by guidance	:practical Corrections needed in measuring distances	:My work Assigning tasks and reporting	Short ,quizzes homework assignments discussions
Sixth	hours 3	B1 / The student will learn to calculate dimensions, areas, and .all field work	:practical Scanning with chain and tape	:practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
Seventh	hours 3	B1 / The student will learn how to interpret and read maps	practical Topographic maps and their uses	:practical Assigning tasks and reporting	Short ,quizzes homework

					assignments discussions
Eighth	hours 3	A1/ The student will have knowledge of the types and parts of the compass and methods of observation using the compass, as well as .correcting observations The compass and drawing the polygon	practical Scanning using a compass		Short ,quizzes homework assignments discussions
Ninth	hours 3	B1 / The student will learn about the components of a .theodolite Its uses and how to use it practically	practical Theodolite	:practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
tenth	hours 3	First exam			
eleventh	hours 3	B1 / The student will learn what AutoCAD and its uses	:practical AutoCAD program	:practical Assigning tasks and reporting	Short ,quizzes homework assignments

					discussions
twelfth	hours 3	A1, B1 / The student will learn to use drawing commands (lines, circles, rectangles, and arcs), Polygons, segmentation and so on. (Also used) Editing commands for copying, moving, rotating, and resizing the drawing. And many other uses	: practical Using the program's user interface and how to adjust all settings	: practical Assigning tasks and reporting	Short, quizzes, homework assignments, discussions
thirteenth	hours 3	A1/ The student will learn how to draw squares, rectangles, and various types of triangles, along with rhombus shapes	: practical Learn about different methods of drawing geometric shapes	: practical Assigning tasks and reporting	Short, quizzes, homework assignments, discussions
fourteenth	hours 3	A1/ The student will be able to create diagrams for farms, fields, and poultry houses	practical How to use the command LINE is used to draw various geometric shapes, such as English letters like H, E, F, L	: practical Assigning tasks and reporting	Short, quizzes, homework assignments, discussions

fifteen th	hours 3	exam
71. Course evaluation		
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams		
72.Learning and teaching resources		
Required textbooks curriculum books, if (available)	AutoCAD 2014	
Main references (sources)	.Please cite the references (sources) if available	
Recommended books and references (scientific (...journals and reports	Textbook of Engineering Drawing k. Venkata Reddy, 2008	
Electronic references and websites	https://www.google.iq/books/edition/%D8%A7%D9%84%D8%B1%D8%B3%D9%85_%D8%A7%D9%84%D9%87%D9%86%D8%AF%D8%B3%D9%8A_%D8%A8%D8%A7%D8%B3%D8%AA%D8%AE%D8%AF%D8%A7/IlIDwAAQBAJ?hl=ar&gbpv=1&dq=%D8%A8%D8%B1%D9%86%D8%A7%D9%85%D8%AC%20%D8%A7%D9%88%D8%AA%D9%88%D9%83%D8%A7%D8%AF&pg=PA17&printsec=frontcover	

Course description template

73.:Course name	
flat area	
74. Course code:	
TAMO103	
75. semester / year	
76. Date of preparation of description	
2024/9/1	
77. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
78. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 3 practical)* 15 weeks 60	
79.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq	
80. Course objectives	
Goals	1. The student should be able to identify the area, its .divisions, types, and uses 2. The student should be able to identify how to take .measurements, prepare columns, and project them 3. The student should have knowledge of mistakes, their .types, and ways to overcome them 4. The student should be able to recognize map drawing and .scales 5. The student should be able to identify obstacles and impediments in measuring distances and record them in .the field logbook
81.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Field training 5. .Practical exercises

6. .The field project
.Self-learning

82.Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory 1 3 practical	A2/ The student should be able to define area, know its types and names, and how to use measuring tools	Theory: Definition of - area - its divisions - its types - its uses the field logbook practical: Field exercise using the field logbook within the college campus	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework k assignment ,nts discussions
the second	Theory 1 3 practical	B2 / The student must be able to Measuring distances, their solutions, and how to erect and lower columns	theoretical: Measuring distances – their conditions – erecting and lowering columns practical: Field exercises in measuring distances using different instruments and a field notebook	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework k assignment ,nts discussions
the third	Theory 1 3 practical	A2, B2 / The student should be able to identify types of measurement errors, methods for overcoming them, and correct	theoretical: Types of errors and ways to overcome them in distance measurement practical: Correcting errors in distance measurements from the previous week	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework k assignment

		distance .measurements		direct dialogue :practical Assigning tasks and reporting	,nts discussio ns
Fourth	Theory 1 3 practical	A2/ The student must be able to Understanding the types of obstacles he faces in measuring distances	theoretical: Obstacles and impediments in measuring distances practical: Draw a polygon around a building to overcome .the drawn obstacles	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homewor k assignme ,nts discussio ns
Fifth	Theory 1 3 practical	B2 / The student must be able to ,Map drawing understanding the type of map, and methods for reducing and .enlarging maps	theoretical: Mapping – Types of maps – Map scales – Methods of reducing and enlarging maps practical: Based on the previous information, a map was drawn of a specific location ,within the institute while training students on some symbols and terminology used in .mapmaking	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homewor k assignme ,nts discussio ns
Sixth	Theory 1 3 practical	B2 / The student should be able to identify the flat ,panel, its tools ,advantages ,disadvantages and usage .requirements	Theory: Flatbed - scanning - its tools its advantages - its - disadvantages conditions of its use practical: Identifying the flat panel, its	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homewor k assignme

			tools, and lifting beams using the beam front cross method +	direct dialogue :practical Assigning tasks and reporting	,nts discussio ns
Seventh	Theory 1 3 practical	B2 / The student must be able to Measuring the area of a flat sheet of paper using different methods	 theoretical: Methods of using the flat plate – the beam method – the front intersection method practical: The method of rotation and reverse intersection	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homewor k assignme ,nts discussio ns
Eighth	Theory 1 3 practical	B2 / The student must be able to Measuring areas according to the surface sheet method and the rotation method	 theoretical: Methods of using the flat plate – Rotation method – Reverse intersection method practical: Exercises in measuring areas by dividing them into triangles	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homewor k assignme ,nts discussio ns
Ninth	Theory 1 3 practical	B2 / The student must be able to Divide the land into triangles and measure the area using the field .method	theoretical: Measuring areas using the field method – dividing the plot of land into triangles – erecting poles at equal intervals practical: Exercises in measuring areas by erecting poles at equal	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homewor k assignme ,nts

			distances + 2 centimeters	:practical Assigning tasks and reporting	discussion ns
tenth	Theory 1 3 practical	A2/ The student should be able to place columns on the map using . Smyson's rule	theoretical: Smyson's rule - placing the columns at unequal intervals practical: Exercises on measuring areas by erecting poles at unequal intervals	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
eleventh	Theory 1 3 practical	A2, B2 / The student must be able to Use the squares on the map to divide it into triangles and .measure them	: Theory Measurements on the map – Dividing the – land into triangles Using squares practical: Map exercises for measuring areas by dividing them into triangles and squares	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
twelfth	Theory 1 3 practical	B2 / The student must be able to Using planning metrics	theoretical: Using the planning scale practical: Using a surveying instrument to measure areas on maps	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework assignments

				: practical Assigning tasks and reporting	discussions
thirteenth	Theory 1 3 practical	A2/ The student must be able to Understanding compass types and determining directions and angles of all kinds	theoretical : Prismatic compass - magnetism and true north - angles of all types : practical Understanding the – Prismatic Compass – Its Parts – Its Uses Taking Readings from It	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
fourteenth	Theory 1 3 practical	B2 / The student must be able to Use a compass to read the angles between the sides	theoretical : Reading angles between sides using a compass practical : Draw a polygon around a building and mark its .angles	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : practical Assigning tasks and reporting	Short ,quizzes homework assignments discussions
fifteenth	Theory 1 3 practical	B2 / The student must be able to Use a compass to determine the interior angles and directions of .polygons	Theory : Calculating interior angles and directions of polygons using a compass practical : Performing calculations from the previous week and drawing a map of the .building	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : practical Assigning	Short ,quizzes homework assignments discussions

				tasks and reporting	
83. Course evaluation					
The distribution of marks out of 100 is based on the tasks assigned to the student, such as daily preparation, daily oral tests, monthly or written tests reports, etc					
84. Learning and teaching resources					
Required textbooks curriculum) books, if (available	.Please list all textbooks, if available				
Main references (sources)	.Please cite the references (sources) if available				
Recommended books and references scientific) journals and (...reports	.Scientific journals, reports and research related to plane spa				
Electronic references and websites	All sites related to surveying and topography				

Course description template

85.:Course name	
General Chemistry	
86. Course code:	
TAMO 104	
87. semester / year	
Decisions	
88. Date of preparation of description	
2024/9/1	
89. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
90. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 3 practical)* 15 weeks 60	
91.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq	
92. Course objectives	
Goals	1. The student should be able to learn basic concepts such as atomic structure, electronic structure, ions, and the forces acting between molecules. 2. The student should be able to know the safety and .prevention procedures within the laboratories 3. The student should be able to identify elements and their .groups 4. The student should be able to separate elements from their .groups or mixtures 5. .The student should be able to perform accurate analysis To ,learn how to collect and extract a sample, analyze statistics and use advanced technological measurements
93.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory training 4. .Dialogue and discussion

		5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
94. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	1 Theory 3 practical	A1/ Theory: The student learns about the concept of chemistry, its types, and its importance :B2 / Practical Understands the method of separating the elements of the first group	Theoretical: Periodic Classification of Elements Practical: Introduction and general guidelines on the theoretical basis of element precipitation	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	1 Theory 3 practical	A1/ Theory: The student learns about the atomic structure of the elements :B2 / Practical Understands the method of separating the elements of the first group	Theory: Atomic Structure Practical: Separating the elements of the first group	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	1 Theory 3 practical	:A1/B Theory The student learns how electrons are .distributed :B2 / Practical Testing an	Theoretical: The electronic configuration of atoms in the periodic table Practical: It involves a method for separating	: Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework

		application for the unknown group 1	the elements of the first group/Unknown	direct dialogue :Practical Assigning tasks and reporting	,assignments discussions
Fourth	1 Theory 3 practical	A1/ Theory: The student learns about the equivalence theory and its foundations :B2 / Practical The student masters separating the elements of Group 2A	Theory: Electronic Valence Theory Practical: It involves a method for separating the elements of Group 2A	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	1 Theory 3 practical	A1/ Theory: The student learns about the theory of bonds, their types, and their importance :Part 3/ Practical The student performs a practical application of the unknown in Group 2A	theoretical: chemical bonds Practical: It involves a method for separating the elements of set A for an unknown	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	1 Theory 3 practical	A1/ Theory: The student will be able to identify the types of chemical solutions :B2 / Practical The student masters separating the	,Theory: Acids, bases and salts Practical: Separating the elements of set B	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

		elements of the , second groupB.		: Practical Assigning tasks and reporting	
Seventh	1 Theory 3 practical	:A1/B Theory The student learns about oxidation-reduction reactions and how they occur Practical: The/2b student performs a practical application of the unknown set. SecondB	Theory: Reduction and Oxidation Reactions Practical: Separating the elements of setB for an unknown	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	1 Theory 3 practical	A1/ Theory: The student learns about methods of titrating chemical solutions :B2 / Practical The student masters separating the elements of the third group	: Theoretical Equilibrium in acidic and basic environments practical: Separating the elements of the third group	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	1 Theory 3 practical	A1/ Theory: The student learns about electric potential and how it occurs :B2 / Practical The student performs a practical application of the	Theoretical: Standard electrical voltage Practical: Separating the elements of the third group/Unknown	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

		.unknown set Third		: Practical Assigning tasks and reporting	
tenth	1 Theory 3 practical	A1/ Theory: The student will be able to identify the concept of nuclear chemistry and its importance :B2 / Practical The student masters separating the elements of the fourth group	Theory: Nuclear Chemistry Practical: Separating the elements of Group Four	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	1 Theory 3 practical	A2/ Theory: The student learns what is meant by non-metallic elements and how to benefit from .them :B1 / Practical The student performs a practical application of the .unknown set Fourth	Theory: Predominant non-metallic elements Practical: Separating the elements of Group Unknown/4	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	1 Theory 3 practical	A1/ Theory: The student will be able to identify noble gases and .their types :B2 / Practical The student masters the separation and detection of anions	Theory: Noble Gases Practical: Separation and detection of anions	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
thirteenth	1 Theory 3 practical	A1/ Theory: The student learns what halogens are and what their properties are :B2 / Practical The student performs a practical application of the anion unknown	, Theory : Halogens their properties and preparation, general properties of the six group elements Practical : Separating anions / Unknown	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	1 Theory 3 practical	B2 / Theory: The student should be able to identify the characteristics .of the fifth group :B2 / Practical The student masters separating the elements of the fifth group	Theory : General properties of elements in Group 5 Practical : Separating the elements of Group Five	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	1 Theory 3 practical	A1/ Theory: The student learns about the characteristics of the fourth group :B2 / Practical The student performs a practical application of the unknown set. Fifth	Theory : General properties of elements in Group IV Practical : Separating the elements of Group Unknown/5	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

95. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
96.Learning and teaching resources	
Required textbooks curriculum) books, if (available	General Chemistry , 2014 Principles of General Chemistry, Dr. Mohi El-Din El-Bakoush, 2024
Main references (sources)	Quantitative of inorganic chemistry Vogel, 1973
Recommended books and references scientific) journals and (...reports	Foundations of Analytical Chemistry Dr. Thabit Al-Ghabsha, Dr. Mu'ayyad Qasim Al-Abaji
Electronic references and websites	https://praxilabs.com/arabic/blog/6-most-important-chemistry-laws/

Course description template

97.:Course name	
Soil foundations	
98. Course code:	
DES101	
99. semester / year	
100. Date of preparation of description	
2024/9/1	
101. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
102. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
103. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail mti.lec224.omar@ntu.edu.iq	
104. Course objectives	
Goals	1. The student should be able to identify the .components of soil, its origin and development 2. ,The student should be able to identify the physical .chemical, and biological properties of the soil 3. The student should be able to identify soil problems such as salinity and alkalinity and how .to treat them 4. The student should be able to collect soil samples ,from the field, divide them for laboratory analysis .and perform basic soil analyses
105. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

6. .Assigning teamwork to reveal leadership skills

106. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1/ Theory : The student explains the concepts of soil science :B1 / Practical The student distinguishes the soil type	Theory : An Introduction to Soil Science Concepts Practical : Soil preparation and sample collection from the field	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ Theory : The student learns about the formation of soil :B1 / Practical The student learns to describe a soil profile	Theory : Origin and Development of Soil Practical : Describing the soil profile	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ Theory : The student learns about soil formation processes :B1 / Practical The student	Theory : Soil Formation Processes : Practical Determining soil texture	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

		identifies the soil texture		direct dialogue :Practical Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1/ Theory: The student explains the physical properties of the soil. :B1 / Practical The student measures the degree of soil reactivity	Theoretical: Physical properties of soil Practical: Estimating the degree of soil reactivity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1/ Theory: The student learns about soil structure B1 / Practical: The student measures the percentage of carbonates in the soil	Theory: Soil building Practical: Estimating the percentage of calcium carbonate in the soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1/ Theory: The student learns about soil temperature B1 / Practical: The student measures the ratio of carbonates and	Theoretical: Soil heat Practical: Estimating carbonates and bicarbonates in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

		bicarbonates in the soil		: Practical Assigning tasks and reporting	
Seventh	2 Theory 3 practical	A1/ Theory : The student identifies the type of soil water :B1 / Practical The student measures the moisture content	Theoretical : Soil water classification Practical : Measuring the moisture content of the soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ In my opinion: The student distinguishes the chemical properties of the soil :B1 / Practical The student measures the sodium and potassium ratios .in the soil	Theory : Colloids and Chemical Properties of Soil Practical Estimating sodium and potassium	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1/ Theory : The student explains organic colloids :B1 / Practical The student measures organic matter	Theory : Organic colloids Practical : Estimating the organic matter content of soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
tenth	2 Theory 3 practical	A1/ Theory: The student becomes familiar with the biological .properties of soil :B1 / Practical The student discovers the humic compounds	: Theoretical Biological properties of soil Practical: Estimating humic compounds in soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ Theory: The student learns about soil salinity .and alkalinity :B1 / Practical The student determines soil salinity	Theory: Salinity and alkalinity in soil Practical: Estimating soil salinity	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ Theory: The student learns about the effect of salinity on agricultural production :B1 / Practical The student measures the cationic capacity .of the soil	Theory: The effect of salinity on agricultural production Practical : Estimating the cationic capacity of soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1/ Theory: The student becomes familiar with the important nutrients in the soil. :B1 / Practical The student explores the extraction of readily available elements from the soil.	Theory: Important nutrients in the soil Practical: Extracting ready-made elements from the soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1/ Theory: The student learns about phosphorus and potassium in the soil. :B1 / Practical The student measures phosphorus in the soil	Theory: Phosphorus and Potassium in the Soil Practical: Estimating phosphorus in soil	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1/ Theory: The student becomes familiar with the classification of Iraqi soils :B1 / Practical The student measures the micronutrients	: Theoretical Classification of Iraqi Soils : Practical Micronutrient Estimation	: Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue : Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
107. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
108. Learning and teaching resources					

Required textbooks curriculum books, if (available)	Principles of Soil Science Dr. Abdullah Al-Ani (1982)
Main references (sources)	Soil interfacial chemistry, soil chemistry
Recommended books and references (scientific (...journals and reports	Sposito , G. (2008) The chemistry of soil. Oxford University Press.
Electronic references and websites	



Course description template

109. :Course name	
Soil physics	
110. Course code:	
DES102	
111. semester / year	
First semester	
112. Date of preparation of description	
2024/9/1	
113. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
114. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
115. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan	
:e-mail mti.lec224.omar@ntu.edu.iq	
116. Course objectives	
Goals	1. The student should be able to understand modern irrigation methods to maintain good soil . properties and increase soil moisture content 2. The student should be able to know the optimal use of water for irrigating the soil in order to enter the agricultural sector with outstanding .efficiency
117. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
118. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	:A1/ Theory Explains to the student the concept of irrigation and the mathematical relationships :B1 /B Practical Enabling the student to solve equations	Theory: Mathematical Relationships :Practical work Mathematical relationships of soil components and soil water equivalent depth	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework k assignment ,nts discussions
the second	2 Theory 3 practical	:A1/ Theory Explains to the student the equivalent depth and its importance :B1 / Practical Explains to the student the basics of humidity measurement	:Theoretical Equivalent depth with solving mathematical problems Practical: Methods for measuring soil moisture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	:A1/Theoretical Explains to the student the concepts of motion :B2 / Practical This demonstrates to the student the measurement of field capacity and wilting point	Theory: The physical concepts of motion and its laws Practical: Measuring field capacity and permanent wilting point	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Fourth	2 Theory 3 practical	:A1/ Theory Explains to the student how to calculate soil texture using the hydrometer .method :B1 / Practical Demonstrates measurement methods using multiple techniques	:Theoretical Estimating soil texture (hydrometric (method : Practical Applications of tissue analysis - Solving mathematical problems of tissue analysis using the hydrometer method	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	:A1/ Theory Explains to the student how to calculate soil texture using the .absorbent method :B1 / Practical Demonstrates measurement methods using multiple techniques	:Theoretical Estimating soil texture (absorbent (method : Practical Applications of tissue analysis - Solving mathematical problems of tissue using the pipette method	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	:A1/ Theory Explains to the student the importance of apparent density :B1 / Practical Enabling the student to understand apparent density	:Theoretical Estimating apparent density Practical: Estimating apparent density in the laboratory solving mathematical) problems on how to (find apparent density	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	:A1/ Theory Enabling the student to understand soil structure :B1 / Practical Explains to the student the forms of soil structure	Theory: Soil building Practical: Solving mathematical problems related to the topic; laboratory work to find the .Atterberg limits	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	:A1/ Theory Explains to the student the importance of soil agglomerations :B1 / Practical Shows the basics of creating clusters	Theory: Applications of the stability of populations : Practical Applications of ensemble stability with problem solving	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	:A1/ Theory Explains to the student the importance of soil texture :B1 / Practical Enabling the student to calculate the plant's water requirement	Theoretical: Soil texture Practical: How to work with dry and wet palm trees	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	:A1/ Theoretical This enables the student to understand the limits of Atterberg :B1 / Practical Explains to the student the calculation of the limits of plasticity and liquidity and the plasticity index	Theory: Applications of the Plastic Limits : Practical Mathematical applications and solving examples of plasticity and liquidity limits	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	:A1/ Theory Explains to the student how water enters the soil :B1 / Practical Shows the student methods for measuring effort	Theoretical: Soil water efforts :Practical Applications in soil water efforts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	:A1/ Theory Enables the student to measure water conductivity :B1 / Practical Demonstrates to the student the importance of water conductivity	Theoretical: Saturated water conductivity : Practical Applications of water conductivity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen th	2 Theory 3 practical	:A1/ Theory Explains sprinkler irrigation systems	Theory: Strip Irrigation Practical	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework

		:B1 / Practical Explains strip irrigation systems	Strip irrigation : system arrangement and types	on the board, the method of direct dialogue :Practical Assigning tasks and reporting	,assignments discussions
fourteen th	2 Theory 3 practical	:A1/ Theoretical Demonstrates the importance of water conductivity in the horizontal soil column :B1 / Practical Demonstrates the importance of water conductivity	Theoretical: Saturated - water conductivity horizontal soil column : Practical Applications of saturated water conductivity in a horizontal soil column	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteen th	2 Theory 3 practical	:A1/ Theory Explains to the student soil tension :B1 / Practical Shows how to measure soil tension using a pressure gauge	Theory: Moisture tensile strength units :Practical Writing units and their equivalents	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
119. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
120. Learning and teaching resources					
Required textbooks curriculum books, if (available			Black,CA1965.Metbook of soil analysis, part1&2. Amer, Soc, Agron . Ins. USA		
Main references (sources)			Central Library		

	College Library
Recommended books and references (scientific (...journals and reports	SSSAJ, the American Journal of Agriculture
Electronic references and websites	Central Library Scientific search engines - the Internet



Course description template

121. :Course name	
forests	
122. Course code:	
DES103	
123. semester / year	
124. Date of preparation of description	
2024/9/1	
125. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
126. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
127. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub :e-mail Samir.f.ayoub@ntu.edu.iq	
128. Course objectives	
Goals	1. The student should be able to understand and comprehend the basics of plant classification, a historical overview of .plant classification, and its stages of development 2. The student should be able to name types of forest trees .according to international rules for botanical nomenclature 3. The student should be able to identify and understand . methods for diagnosing and classifying forest trees
129. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
130. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define forests, their economic importance, and their relationship to humans	Theory: The economic importance of forests, definition of a forest, the relationship between forests and humans practical: Identifying forest trees and the physical characteristics of each species in the field	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ The student should be able to understand the basics of geographical distribution and the reasons for its spread	:theoretical Geographical ,distribution of forests forest distribution and reasons for their spread, vertical distribution of forests practical: Seed ,propagation collection, and ;extraction facilities collection dates and ;storage methods importance of machinery and equipment used in . seed collection	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A2/ The student must be able to Understanding the different classifications of forest trees according to genera and species	theoretical: The different classifications of forest trees, forest classification by ,genera , species source, propagation .methods, and purpose Practical: Forest nurseries, their	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

			,benefits, types ,methods of sowing preparation of sowing and individualization .methods	:Practical Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1, B1 / The student must be able to Understanding the economic benefits of forests in terms of productivity and protection	theoretical: Benefits - of forests ,productive, protective tourism, and social benefits :Practical Reproductive characteristics of trees	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B1 , C2/ The student should be able to Understanding methods of forest seed propagation ,and collection and factors affecting seed .viability	theoretical: Forest nurseries , seed tree testing, propagation methods, seed collection and extraction, factors affecting seed viability :practical Service operations and preparation of the ,shrines of separation the different environments of ,separation preparation of the shrines of separation and continued maintenance of the .shrines of separation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B1 , C2/ The student should be able to understand the factors affecting forest planning, seedling	:Theory - Forest planning Factors affecting - forest planning - Planting dates - Planning methods Planting techniques	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework

		planting methods and techniques	:practical A scientific visit to the forests and nurseries near the area and the preparation of models	method of direct dialogue ::Practical Assigning tasks and reporting	,assignments discussions
Seventh	2 Theory 3 practical	A1, B1 , C2/The student should be able to Forest structure, its main features and drawbacks	:theoretical: Forests ,their composition characteristics, and drawbacks practical: Forestry planning and planting methods, machinery and equipment used in planning, types of planting methods and their application	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B1 / The student must be able to Understanding and comprehending pruning and thinning methods and their importance to forest trees and the ecosystem	theoretical: Pruning and thinning in forests: the importance of pruning and thinning, and types of pruning and .thinning :practical Learn about other forest trees, their ,types, characteristics and benefits, and see examples of them through slideshows or .films	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, B1 / The student must be able to Understanding forest tree maintenance methods, their importance, and	theoretical: Forest conservation - the importance of forest conservation, its stages of development harmful biological - , factors (humans , animals , diseases	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework

		the biological factors affecting them	insects and (undergrowth :practical Pruning and thinning ,operations: definition types, slideshows or videos	direct dialogue ::Practical Assigning tasks and reporting	,assignments discussions
tenth	2 Theory 3 practical	A1, B1 / The student should be able to identify the abiotic factors harmful to forests, their main causes, and methods of protection against them	theoretical: abiotic factors Harmful factors - The importance of studying harmful abiotic factors and their impact on forests) Abiotic factors - , climate factors , fires (toxic gases practical: Forest conservation: A practical application of firefighting techniques	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B1 , C2/The student should be able to Definition of the forest environment and the environmental factors affecting it	Theory: Forest - environment Definition - The effect ,of forests on heat .wind, and humidity practical: Separation processes, separation ,environments ,separation time .separation methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, C2/The student must be able to Measuring the biological characteristics of forest trees and what methods are	theoretical: Forest measurements, tree height, tree diameter - and tree volumes .tree growth and age	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework

		used to measure each characteristic	practical: Forest measurements: height, diameter, growth, age Devices used in the measurements	method of direct dialogue ::Practical Assigning tasks and reporting	,assignments discussions
thirteenth	2 Theory 3 practical	A1, C2/The student must be able to Defining the process of forest investment and how to transform them into tourist and recreational areas while protecting their trees from illegal logging	theoretical: Forest investment: its importance, definition, logging trunk cleaning, tree transport and removal practical: Scientific films, the importance of forests and their investment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B1 / The student should be able to understand the wood manufacturing process, the properties of the wood used, and the methods of manufacturing it	theoretical: Wood technology and wood industries - Wood properties - Wood manufacturing My work: Tree cutting, cutting stages, cutting, felling cleaning and chopping operations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue ::Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	/B1 , C2 Scientific increase to one of the wood factories With a scientific trip for students to the forests	theoretical: Presenting slides or a scientific trip practical: Identifying forest trees and the physical characteristics of each species in the field	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
				::Practical Assigning tasks and reporting	
131. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
132. Learning and teaching resources					
Required textbooks curriculum) books, (available	if	Public Forests / Younis Muhammad Qasim Al-Alusi			
Main references (sources)					
Recommended books and references scientific) journals and (...reports		Classification of Forest Trees by Dr. Daoud Muhammad Daoud			
Electronic references and websites					

Course description template

133. :Course name	
Arid climate	
134. Course code:	
DES104	
135. semester / year	
136. Date of preparation of description	
2024/9/1	
137. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
138. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
139. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub :e-mail Samir.f.ayoub@ntu.edu.iq	
140. Course objectives	
Goals	1- The student should be able to identify the elements .of the climate of arid regions 2- The student should be able to identify the relationship between the elements of arid regions and .the phenomenon of desertification 3- The student should be able to identify the .classification of climatic regions in the world 4- The student should be able to identify the characteristics of soil, water, temperature, and light in .arid regions 5- ,The student should be able to read temperature .weather, and rainfall figures in weather forecasts 6- The student should be able to identify solutions for .desertification and solar radiation 7- The student should be able to identify the .characteristics of groundwater in deserts
141. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming

			3. .Practical training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills		
142. Course structure (Remember all the theoretical and practical (vocabulary)					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A3, B3 / The student should be able to define climatology and its branches	Theory: An Introduction to .Climatology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	B3 , C1/ The student should be able to define regions , their types, and the characteristics of each	theoretical: Climatic regions and the characteristics of each region: definition of ,the region characteristics of the region, different water elements	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A3, B3 , C1/ The student should be able to identify the topography of tropical climate regions and the distribution of water and land with respect to .latitude	theoretical: Location ,in relation to latitude distribution of water ,and land, topography tropical climate region, monsoon region, polar region	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A3, B3 / The student must be able to Understanding	theoretical: Arid ,climate region .Mediterranean region The arid region	:Theoretical Auditory :methods the method	Short ,quizzes

		the extent of the arid region along circular latitude lines and its characteristics	extends along the 18-north latitude line ° 30 Characteristics of the .arid region	of writing on the board, the method of direct dialogue	homework ,assignments discussions
Fifth	2 Theory 3 practical	B3 , C1/ The student must be able to knowledge Increased temperature range between winter and summer, and between night and ;day; low rainfall high evaporation rates; and a scarcity and limited variety of .plants	theoretical: High ,temperature range between winter and summer, and night ,and day, low rainfall high evaporation rates, low number and .variety of plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A3/ The student must be able to Classification of arid desert ,climate zones ,their definition ,characteristics .and rainfall	Theory: Classification of the most important ,arid climate regions deserts, their ,definition characteristics, and .rainfall	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A3, C1/ The student should be able to knowledge The components of the atmosphere are low-pressure systems and .thunderstorms Atmospheric humidity and .condensation	:theoretical .The atmosphere Solar and terrestrial .radiation .Atmospheric pressure .The wind .Air masses Fronts and low- .pressure systems Low pressure systems .and thunderstorms Atmospheric humidity .and condensation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Eighth	2 Theory	A3, B3 , C1/ The student should be able to Understanding climatic regions and the characteristics of ,each region including the definition of the region, its , characteristics and the different .water elements	theoretical: Climatic regions and the characteristics of each region: definition of ,the region characteristics of the region, different water elements	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A3, C1/ The student should be able to identify the topography of tropical climate regions and the distribution of water and land with respect to .latitude	theoretical: Location ,in relation to latitude distribution of water ,and land, topography tropical climate region, monsoon region, polar region	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A3, B3 / The student should be able to identify the topography of tropical climate regions and the distribution of water and land with respect to .latitude	theoretical: Arid ,climate region .Mediterranean region The arid region extends along the 18-north latitude line ° 30 Characteristics of the . .arid region	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	A3, C1/ The student should be able to Understanding the extent of the arid region along circular latitude lines and its characteristics	Theoretically: High temperature range between winter and summer, and between night and day; low rainfall; high evaporation rates; low plant density and .variety	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory	A1/ The student must be able to Classification of arid desert ,climate zones ,their definition ,characteristics .and rainfall	:theoretical Classification of the most important arid climate regions (deserts), their ,definition characteristics, and .rainfall	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	A3, B3 / The student must be able to knowledge The components of the atmosphere are low-pressure systems and .thunderstorms Atmospheric humidity and .condensation	:theoretical .The atmosphere Solar and terrestrial .radiation .Atmospheric pressure .The wind .Air masses Fronts and low- .pressure systems Low pressure systems .and thunderstorms Atmospheric humidity .and condensation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	A1/ The student should be able to , define regions their types, and the characteristics .of each	theoretical: Climatic regions and the characteristics of each region: definition of ,the region characteristics of the region, different water elements	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	A3, B3 , C1/ The student should be able to identify the topography of tropical climate regions and the distribution of water and land with respect to .latitude	theoretical: Location ,in relation to latitude distribution of water ,and land, topography tropical climate region, monsoon region, polar region	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
143. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
144. Learning and teaching resources	
Required textbooks curriculum books, if (available	Environmental Science and Philosophy / Dr. Ayoub A Dayyeh
Main references (sources)	
Recommended books and references scientific journals and (...reports	• Applied Climatology– Dr. Ahmed Samir Halawa, Dar Al-Marikh Publishing House. • Climatic Geography– ,Dr. Fathi Abu Ayana Dar Al Nahda Al Arabiya. • Climate and water resources in arid and semi-arid regions– Dr. Abdul Qader Hijazi.
Electronic references and websites	

Course description template

145. :Course name	
Soil chemistry	
146. Course code:	
DES105	
147. semester / year	
First semester	
148. Date of preparation of description	
2024/9/1	
149. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
150. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
151. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan	
:e-mail mti.lec224.omar@ntu.edu.iq	
152. Course objectives	
Goals	1. The student should be able to understand and comprehend matters related to the chemical .properties of soil 2. The student's ability to choose the appropriateness of the factors affecting the knowledge and study of the most important chemical reactions that occur in .the soil 3. The student should be able to identify and understand the basics of detecting the type of .minerals that control dissolution and precipitation 4. The student should be able to identify the factors .that influence chemical reactions
153. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion

		5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
154. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	:A1/ Theory Introducing the student to the types of elements that make up the Earth's crust :B1 / Practical The student collects different soil samples	Theoretical: An overview of the chemical composition of the Earth's crust Practical: The student plans to collect comprehensive field samples and prepare them for chemical .analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ In my opinion: The student identifies the close relationship between the three phases of soil :B1 / Practical The student learns about the basic units	Theoretical: The student understands the relationship of soil chemistry to other .sciences Practical: Basic and Scientific Units	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ Theory: The student identifies the most important elements involved in the formation of compounds in .the Earth's crust :B1 / Practical Measures total	:Theoretical Chemistry of the inorganic part :Practical work Methods for estimating soilpH and total dissolved salts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

		dissolved salts in the soil		:My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1/Theory: The student learns about the most important sources of organic matter :B1 / Practical Cation exchange capacity is determined by sodium acetate saturation	Theory: Sources of organic matter :Practical application Cation exchange capacity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A2/ Theory: The student learns about the physical and chemical properties of humus through the color of the soil :B1 / Practical Ammonium oxalate is used in the determination of active calcium carbonate	Theoretical: Physical and chemical properties of humus Practical: Active calcium carbonate	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1/Theory: The student identifies the chemical composition of the soil solution from ionic species A1/ Practical: The student estimates the gypsum content in the soil using acetone	Theoretical: The chemical composition of the soil solution My work: Gypsum in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1/ In my opinion: The student explains the process of electron/proton loss :A1/Practical Calculates the regulatory capacity of the soil through pH readings.	Theory: Acid-base neutralization reactions practical: Soil regulatory capacity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ Theory: The student explains the phenomenon that occurs between the solid and liquid phases of the soil :B1 / Practical Calculates the pH in the soil through pH readings.	Theory: Double electrical layer My work: Soil filtration	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	:A1/Theoretical The student describes the ion exchange process using the law of mass action :Part 2/ Practical The student prepares a soil extract	Theory: Ion exchange properties :Practical work Calculating exchanged ions in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory 3 practical	B1 / Theory: The student describes the physicochemical equations	:theoretical Physicochemical equations (Frenelich Langmeier) and , chemical equations	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework

		, Frenkelch Langmuir) and the chemical ,equations (Kehr Vanslow , Capon .(A1/Practical: The student prepares a soil extract	Ker, Vanslow , Capon) (:Practical work Calculating exchanged ions in soil	on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
eleven th	2 Theory 3 practical	:Part 2/ Theory The student learns about the process ofCO ₂ gas dissolving in .water :B1 / Practical Measures calcium in soil extract by titration with EDTA	:TheoreticalCO ₂ -H ₂ O system CaCO ₃ - CO ₂ -H ₂ O :Practical work Calculating exchanged ions in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	:A1/Theoretical Explains to the student the nature of phosphoric acid ionization :B1 / Practical Measure the soluble chloride in the soil extract using a titration .with silver nitrate	Theoretical: The nature of phosphoric acid ionization practical: Calculation of exchanged ions in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory 3 practical	A1/ Theory: The student draws dissolution diagrams to identify the metal controlling .solubility :A1/Practical Extract the humic	:Theoretical Dissolution diagrams for carbonate minerals Practical work: Dalian compounds in soil	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

		compounds in the soil by neutralizing them with a sodium bicarbonate . solution		direct dialogue :My work Assigning tasks and reporting	
fourteenth	2 Theory 3 practical	A1/ Theory: The student explains the importance of soilpH and the main sources of acidity in it. :B1 /Practical Calculates the ionic strength of ,monovalent divalent, and tertiary .compounds	Theory: The importance of studying soilpH and what are the main sources of acidity in the soil. Practical work: Ionic strength in soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	B1 /Theory: The student identifies the type of salinity and its sources :A1/Practical Calculates the activity coefficient for mono-, di-, and tri-component compounds	Theory: Sources of soil salinity Practical: Soil Activity Factor	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

155. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

156. Learning and teaching resources

Required textbooks curriculum books, if (available)	Soil Chemistry Books by Dr. Kazem Mashhout , 1986
Main references (sources)	Central Library College Library
Recommended books and references	The book (Soil Minerals) by Professor Salman Khalaf Issa

scientific journals and) (...reports	
Electronic references and websites	Central Library Scientific search engines - the Internet



Course description template

157. :Course name	
sports	
158. Course code:	
NTU104	
159. semester / year	
First semester	
160. Date of preparation of description	
2024/9/1	
161. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
162. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 1 practical)* 15 weeks 30	
163. Name of the course coordinator (list all names, if there is more than one)	
:the name	
:e-mail	
164. Course objectives	
Goals	1. The student should be able to identify the most important basic information about different types of .sports 2. The student should be able to identify the classification .of sports 3. .The student should be able to act in a sporting spirit
165. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
166. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	1 Theory 1. My work	A1, B1 , C1/The student should be able to understand the basic concepts of sports, their types, and their importance	- Theoretical: Sports ,Definition Importance, and Types :practical: Sports ,Definition Importance, and Types	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	1 Theory 1. My work	A1/ The student should be able to understand the mechanism of body movement and the effects of each movement	theoretical: The mechanism of human body movement practical: The mechanism of human body movement	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	1 Theory 1. My work	B1 , C1/ The student should be able to know Common sports injuries and how to treat them	theoretical: Common sports injuries practical: Common sports injuries	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Fourth	1 Theory 1. My work	A1, B1 / The student should be able to know According to the rules followed in the game of basketball	theoretical: basketball practical: basketball	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	1 Theory 1. My work	B1 / The student should be able to know According to the rules followed in the game of basketball	theoretical: Basketball rules practical: Basketball rules	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	1 Theory 1. My work	A1, C1/ The student should be able to know Basic skills in table tennis	Theory: Table Tennis (Table Tennis), Basic Skills practical: Table tennis (table tennis), basic skills	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	1 Theory 1. My work	A1/ The student should be able to know Basic skills in volleyball	theoretical: volleyball practical: volleyball	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	1 Theory 1. My work	A1, B1 / The student should be able to know Basic skills in swimming and the rules related to it	theoretical: swimming practical: swimming	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	1 Theory 1. My work	A1/ The student should be able to know Basic skills and rules of tennis	theoretical: tennis practical: tennis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	1 Theory 1. My work	B1 /C1/ The student should be able to know Basic skills in ,handball, its rules and common .types of mistakes	theoretical: Handball practical: Handball	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	1 Theory 1. My work	A1, B1 / The student should be able to know Rules followed in handball	Theory: The Laws of Handball practical: Handball rules	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	1 Theory 1. My work	A1/ The student should be able to know Basic skills in athletics and ways to avoid common mistakes in this sport	theoretical: Athletics practical: Athletics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	Theory 1 1. My work	B1 , C1/ The student should be able to know Basic skills in ,football dimensions of the field, and distance between playing .lines	theoretical: soccer practical: soccer	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	Theory 1 My .1 work	A1, C1/ The student should be able to know How to manage sports competitions and contests, and the rules governing .each of them	theoretical: Sports Competitions and Events Management practical: Sports Competitions and Events Management	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	Theory 1 My .1 work	A1, B1 , C1/ The student should be able to know Sports laws and regulations	theoretical: Sports laws and regulations practical: Sports laws and regulations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
167. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
168. Learning and teaching resources	
Required textbooks curriculum) books, if (available	Sports course manual
Main references (sources)	
Recommended books and references scientific journals and (...reports	
Electronic references and websites	

Course description template

169. :Course name	
Natural resource economics	
170. Course code:	
TAMO151	
171. semester / year	
First semester	
172. Date of preparation of description	
2024/9/1	
173. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
174. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
175. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq	
176. Course objectives	
Goals	1. The student should be able to manage economic and .natural resources, their types, and their importance 2. The student should be able to identify how to optimally . utilize natural resources and explain their uses 3. The student should have knowledge of land , human, and . water resources 4. The student should be able to identify ways to conserve .these resources and to demand and supply them
177. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. Practical training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
178. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	:A1/ Theoretical The student learns about methods and techniques used to study and explore natural resources.	Theory: Research Methods in Economic Resources	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	:B2 /Theory Explains to the student the characteristics of natural resources	:theoretical Characteristics of natural resource - economics Classification of natural resources	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	:B2 , C3/ Theory Learns how to use land and identifies the best ways to use it	theoretical: Natural - Resource Economics Concepts and Characteristics of Land	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	:A1, A2/ Theory He understands how the population is distributed and how resources are distributed fairly.	theoretical: Land use density and the factors affecting it	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory	:B2 , B3/ Theory Distinguishes between the natural and economic supply of land	theoretical: Display of land resources and increase of the economic supply of land	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	:A1, C3/ Theory Define rent and explain its types	Theory: The economic and social importance of agricultural land rent	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	:B2 / Theory Midterm exam	theoretical: Midterm exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	:A1, B2 / Theory Explains the factors affecting the value of agricultural land	:theoretical Evaluating agricultural land resources and factors affecting land value	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Ninth	2 Theory	:A1/ Theory Explains the concept of possession and the factors affecting it	: Theoretical Agricultural Land Ownership - Its Concept and Influencing Factors	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	B2 / Theory: It identifies the farmer's needs and plans to develop .agricultural land	theoretical: Land ownership characteristics and its importance	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	/A1, B2 , C3 Theoretical: The student learns about agricultural ,land resources their types, and .their importance	Theory: Agricultural Land Resources in Iraq and Their Divisions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	:A1/ Theory Understands ,human resources ,decision analysis and developing management .skills	theoretical: Human resource economics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory	:Theoretical semester exam	theoretical: Midterm exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	A1/ Theory: The student learns the basic concepts of the workforce and helps in workforce development.	:theoretical Agricultural workforce and human resources in Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	:A1, B2 / Theory The student learns about the concepts of agricultural policy	:theoretical agricultural policy	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
179. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
180. Learning and teaching resources					
Required textbooks curriculum) books, (available		if Land Economics and Agrarian Reform, Dr. Abdul Khaliq Muhammad			

Main references (sources)	The Economics of Agricultural Reform, Dr. Abdul Wahab Matar Al-Dahri
Recommended books and references scientific journals and (...reports)	.Economics of Natural and Environmental Resources, Dr Hamad bin Mohammed Al Sheikh
Electronic references and websites	nothing



Course description template

181. :Course name					
Agricultural guidance					
182. Course code:					
TAMO152					
183. semester / year					
184. Date of preparation of description					
2024/9/1					
185. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
186. Number of credit hours (total) / Number of units (total)					
hours (2 hours of theory)* 15 weeks 30					
187. Name of the course coordinator (list all names, if there is more than one)					
the name: M.M. Ziad Amer Mustafa					
:e-mail mti.Iec96.Zeyad@ntu.edu.iq					
188. Course objectives					
Goals		1. The student should be able to recognize the concept of .agricultural extension 2. The student should be able to recognize the role of agricultural extension in agriculture to achieve high rates . of agricultural production			
189. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
190. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method

the first	2 Theory	:A2/ Theory Understanding agricultural extension concepts	Theory: Agricultural ,Extension ,Introduction ,Definition Philosophy of Agricultural Extension	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	:A2/ Theory Identifying the goals and role of extension services in rural development	theoretical: The objectives of ,agricultural extension the role of agricultural extension in rural development, and the position of agricultural extension among agricultural .sciences	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	:B1 / Theory Understanding the guidance systems and their administrative organization	:theoretical Agricultural extension systems, principles and functions of administrative organization for .agricultural extension	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	:A2, B1 / Theory Identifying guidance systems	:theoretical Agricultural extension organization in Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory	:A2/ Theory Introduction and preface to communication	:theoretical ,Communication communication elements, adoption	:Theoretical Auditory :methods the method	Short ,quizzes

				of writing on the board, the method of direct dialogue	homework ,assignments discussions
Sixth	2 Theory	:B1 / Theory Identifying the methods and aids for agricultural extension	Theory: Methods and Aids for Agricultural Extension	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	:Theoretical semester exam	Theoretical: semester exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	:A2, C2/ Theory Understanding leadership and its types	:theoretical Leadership, definition of leadership, types of leadership according to the leadership style used	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	:B1 / Theory Understanding leadership and its relationship to mentoring work	theoretical: Types of leadership according to the metaphorical method, leadership and its relationship to ,guidance work	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework

			qualities of a leader in rural society	method of direct dialogue	,assignments discussions
tenth	2 Theory	:A2, B1 / Theory Understanding social change and its causes	theoretical: Social change and its causes	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	:B1 / Theory Identifying the ,levels, obstacles and drivers of change	Theory: Levels of change, obstacles and drivers of change in the field of agricultural extension	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	:A2, C2/ Theory Understanding the principles of agricultural extension planning	theoretical: Guidance program plans/Guidance planning, Guidance planning principles	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteen nth	2 Theory	:B1 , C2/ Theory Understanding the concept of education and learning	theoretical: Learning and teaching, the ,concept of learning the teaching and learning process	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

fourteenth	2 Theory	:A2/ Theory Understanding agricultural extension concepts	Theory: Theories of guidance education ,adult education characteristics of adults	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	Theory: Exam	theoretical: exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
191. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
192. Learning and teaching resources					
Required textbooks curriculum) books, if (available		and Jadari agricultural extension science			
Main references (sources)		,Agricultural extension and its role in rural development Al-Samarrai			
Recommended books and references scientific) journals and (...reports		Various books and magazines			
Electronic references and websites		Various internet sites			



Course description template

193. :Course name	
general plant	
194. Course code:	
DES151	
195. semester / year	
First semester	
196. Date of preparation of description	
2024/9/1	
197. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
198. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
199. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Mohamed Salem Ahmed :e-mail mohameedsa66@ntu.edu.iq	
200. Course objectives	
Goals	The student should be able to understand and comprehend .1 what is related to plant anatomy and its relationship to other . sciences The student should be able to identify the most important .2 scientific methods for understanding plant anatomy and .recognizing the diversity of plant tissues The student should be able to examine plant cells and all .3 .their components The student should be able to explain the functions of plant .4 .tissues and their relationship to cells
201. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
202. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define the plant kingdom and classify plants in terms of ,species, genus .and variety	Theory: The Plant Kingdom practical: Plant classification – Plant kingdom – Species	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B1 / The student should be able to know Vascular ,plants, their types and the characteristics of .each	:theoreticalTrachoo vascular plants phyta Vascular plants practical: Plant morphology – plant parts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ The student should be able to know The pollination and fertilization process that occurs in flowering plants and types of flowers	theoretical: Flowering plants – pollination and fertilization practical: To differentiate between monocotyledonous and dicotyledonous plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

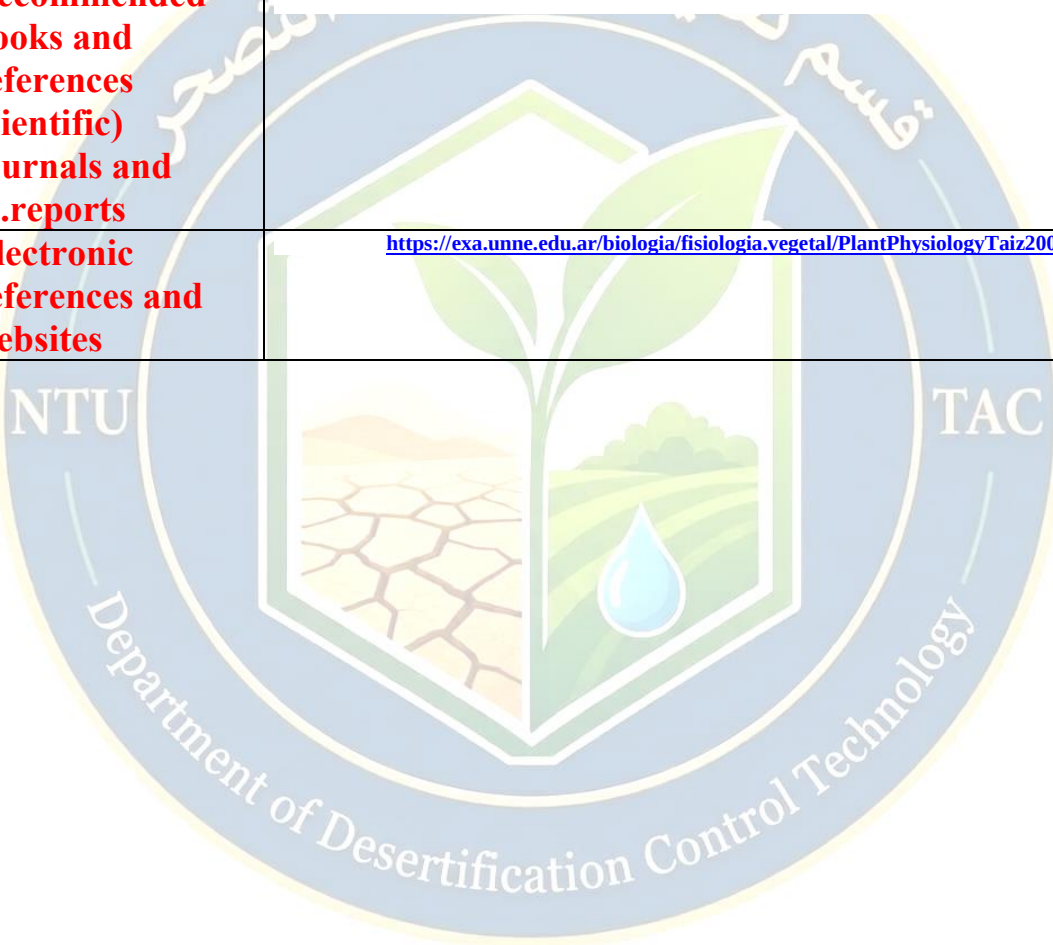
				tasks and reporting	
Fourth	2 Theory 3 practical	A1, B1 / The student should be able to know Methods of seed ,germination flower components, and flower types	– theoretical: Flower Fruit – Seeds and their germination practical: Plants covered with seeds (angiosperm) and those with naked seeds(gynosperm)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B1 / The student should be able to identify the types of plant tissues, the ,function of each and where they .are found	theoretical: Plant tissues – their types practical: Leg dissection under a microscope	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B1 / The student should be able to identify the components of the vegetative system and the function of each part in the life of .the plant	Theoretical: The vegetative system of the plant – stem structure practical: Leg dissection under a microscope	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1, B1 / The student should be able to know ,Root components types, and how they absorb nutrients from the soil	theoretical: Root total Root zones – practical: Leg dissection under a microscope	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B1 / The student should be able to identify the components of a plant leaf and their role in the process of photosynthesis	theoretical: Paper composition practical: Seed and flower anatomy	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, B1 / The student should be able to know Stages of plant cell division	theoretical: Plant cell stages of division – practical: Practical seed germination	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, B1 / The student should be able to know Types of stomata and their role in evaporation and transpiration	theoretical: Stomata – and their forms Stomata of desert plants and their effect on transpiration :practical Examination of stomata in various plants, including .desert plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B1 / The student should be able to identify ,the types varieties, and shapes of algae	Theory: Algae – their – types – their forms lichens practical: Plant cell division and) (reproduction	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B1 / The student should be able to identify the types of bacteria, their components, and the importance of .each type	theoretical: Bacteria – and their forms Seed-associated bacteria (nitrogenous (and nodular bacteria :practical Examination of samples of algae and lichen under a microscope	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1, B1 / The student should be able to know ,Types of fungi their shapes, and their role	– theoretical: Fungi their types and forms :practical Examination and drawing of the shapes and types of bacteria	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B1 / The student should be able to know The mushroom, its components and importance	:theoretical) Mushrooms Cyprinos (musculoskeletal practical: Examining and drawing shapes of fungi	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B1 / The student should be able to know Mycorrhizal fungus : its components and importance	:theoretical Mycorrhizal fungi practical: Discussion of reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
203. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
204. Learning and teaching resources	
Required textbooks curriculum) books, if (available	Plant Morphology and Anatomy, Abdullah Rashid Al-Duaiji and Muhammad Abdo Al-Awdat (1992)
Main references (sources)	General Botany, Hussein Al-Arousi and Osama Abdel Hamid Al-Manoufi
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	https://exa.unne.edu.ar/biologia/fisiologia.vegetal/PlantPhysiologyTaiz2002.pdf



Course description template

205. :Course name	
Principles of Animal Production	
206. Course code:	
DES152	
207. semester / year	
208. Date of preparation of description	
2024/9/1	
209. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
210. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
211. Name of the course coordinator (list all names, if there is more than one)	
:the name	
:e-mail	
212. Course objectives	
Goals	1. The student should be able to classify animals within the .animal kingdom 2. The student should be able to identify the physical characteristics and performance requirements. Productivity of global and local livestock breeds 3. The student should be able to understand the nature of .animal housing and its types 4. The student should be able to identify the most important .diseases that affect cattle and sheep
213. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

214. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A2, B3 / The student should be able to know The economic importance of livestock Field operations that take place on a daily, monthly, or seasonal basis with farm animals	Theory: The economic importance of livestock My work: Field operations that take place on a daily monthly, or seasonal basis with farm animals.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A2, B3 / The student should be able to know The animal kingdom and its classification Milking , milking methods, and preparing cows for the milking process	Theory: The Animal Kingdom and its Classification :Practical work Milking, milking methods, and preparing cows for milking	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	B3 / The student should be able to know Origin of cattle, their place in the animal kingdom, global , breeds of cattle Iraqi cattle	Theory: Origin of cattle, position in the ,animal kingdom global breeds of cattle Iraqi cattle , :PracticalAverage rainfall in stations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

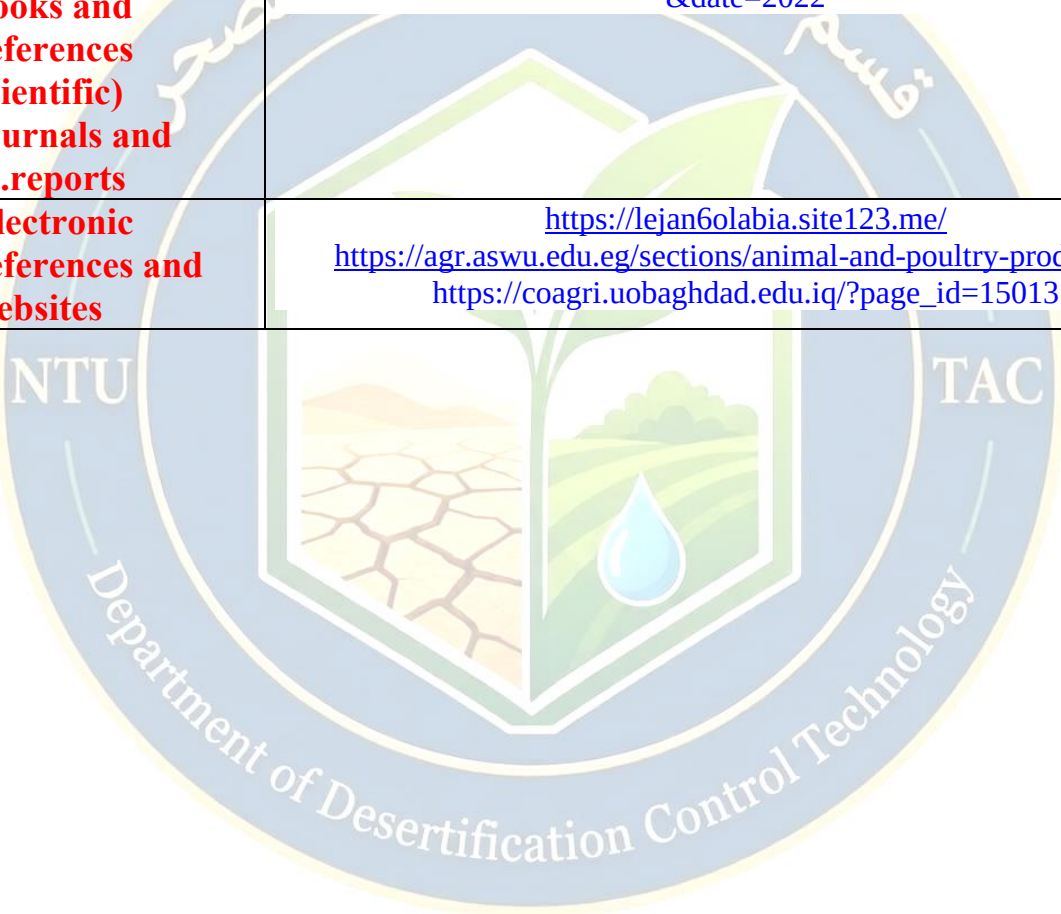
				:My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A2, B3 / The student should be able to know ,Origin of sheep global and local breeds of sheep and goats	Theory: The origin of sheep, global and local breeds of sheep and goats :Practical Intensity-duration analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	B3 , C3/ The student should be able to know The origin of the buffalo, global ,and local breeds ,general physiological and reproductive ,characteristics types of buffalo and their meat and milk production	Theory: The origin of the buffalo, global ,and local breeds , general physiological and reproductive characteristics , types of buffalo and their meat and milk production :Practical Morphological analysis of basins	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A2, B3 / The student should be able to know Factors affecting the productive efficiency of cows and sheep genetic and) environmental (factors	Theoretical : Factors affecting the productive efficiency of cows and sheep genetic and) (environmental factors :Practical application Discharge measurement in rivers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Seventh	2 Theory 3 practical	A3/ The student should be able to know The economic importance of the poultry industry	Theory: The economic importance of the poultry industry :Practical work Separation of hydrographs	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A3/ The student should be able to know Types and breeds of laying hens, meat chickens, and dual-purpose chickens	Theory: Types and ,breeds of laying hens meat breeds, and dual-purpose chickens :Practical Frequency analysis of flood	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A2, B3 / The student should be able to know Poultry production projects hatchery, poultry) farms, parent stock and breeder (farms	Theory: Poultry production projects hatchery, poultry) farms, parent stock (and breeder farms My work: A scientific visit to the Animal Resources Department	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A2/ The student should be able to know Basics of raising chickens	Theory: Fundamentals of Chicken Farming :practical	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A2/ The student should be able to know Poultry slaughterhouse design	Theory: Design of poultry slaughterhouses :My work Flow routing	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A2, B3 / The student should be able to identify turkeys and waterfowl, the importance of breeds, and the importance of .production	Theory: Turkeys and ,Waterfowl Importance of Breeds and Importance of Production :Practical Measurement of flow in Aquifers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A2/ The student should be able to know Fish, their ,types classification, and habitats	Theory: Fish, their ,types, classification and habitats :My workSeepage in hydraulic structures	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	B3 / The student should be able to know External appearance and biological measurements of fish	Theoretical: External appearance and biological measurements of fish :My workflow line	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A2, B3 / The student should be able to know fish environment	Theory: Fish Environment :PracticalAverage rainfall in stations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
215. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
216. Learning and teaching resources	
Required textbooks curriculum) books, if (available	Principles of Animal Production, authored by Prof. Dr. Najib ,Tawfiq Ghazal, Prof. Dr. Nahel Muhammad Ali Suleiman and Prof. Dr. Radi Khattab Abdullah, 2000
Main references (sources)	.Principles of Animal Production, by Professor Dr Muhammad Ali Makki Al-Rubaie, 2020, Al-Noor Library
Recommended books and references scientific) journals and (...reports	https://www.arabimpactfactor.com/pages/tafaseljournal.php?id=8466&date=2022
Electronic references and websites	https://lejan6olabia.site123.me/ https://agr.aswu.edu.eg/sections/animal-and-poultry-production/ https://coagri.uobaghdad.edu.iq/?page_id=15013



Course description template

217. :Course name	
Plant physiology	
218. Course code:	
DES153	
219. semester / year	
First semester	
220. Date of preparation of description	
2024/9/1	
221. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
222. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 3 practical)* 15 weeks 60	
223. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Mohamed Salem Ahmed :e-mail mohameedsa66@ntu.edu.iq	
224. Course objectives	
Goals	أ- The student should be able to identify general .plants ب- The student should be able to identify the relationship between soil components and plant .condition ت- The student should be able to identify and understand the type and relationship of the plant with . soil water, air, soil temperature and moisture tension ث- The student should be able to understand the .general physiological processes of plants
225. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
226. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	1 Theory 3 practical	A1, B1 / The student should be able to explain the concept of the plant cell – its components – its functions – its characteristics	Theory: The plant cell its components – its – functions – its characteristics practical: Learn about laboratory equipment and how to prepare .chemical solutions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	1 Theory 3 practical	A1/ The student must be able to It identifies the types of solutions their – – concentrations the solute and the – solvent – acids .bases – salts	theoretical: Types of solutions – their – concentrations – solute and solvent .acids – bases – salts practical: Microscopy and cell examination using a light – .microscope	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	1 Theory 3 practical	B1 / The student should be able to understand and comprehend the concepts of diffusion and osmosis	theoretical: Diffusion and Osmosis practical: Detection of some substances in :the cell , carbohydrates .protein , oils	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	1 Theory 3 practical	A1, B1 / The student should be able to explain the concepts of ,water potential infiltration, and permeability. The way it occurs and the factors that influence it	theoretical: Water ,potential, infiltration and permeability practical: Experiments applying the laws of diffusion, membrane permeability, and absorption	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	1 Theory 3 practical	B1 / The student must be able to Understanding the importance of water – physical – properties methods of water .absorption	theoretical: The – importance of water – physical properties methods of water .absorption practical: Experiments demonstrating osmolarity , osmotic pressure , and plasma	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	1 Theory 3 practical	A1/ The student must be able to Understanding and comprehending the concept of nutrient absorption And the way it happens	Theory: Nutrient absorption practical: Experiments demonstrating water transport in wood and root pressure	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	1 Theory 3 practical	B1 / The student must be able to Understanding how plant sap rises in wood and its importance to the plant	theoretical: Ascent of plant sap in the wood (ascending tissue) practical: Experiments illustrating the process of bark transport	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	1 Theory 3 practical	A1, B1 / The student should be able to explain the concept of ,phloem transport how it occurs, the factors affecting it, and its importance to the .plant	theoretical: Transport by phloem (descending tissue) practical: Studying stomata and the ,transpiration process and experiments demonstrating the occurrence of .transpiration in leaves	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	1 Theory 3 practical	A1, B1 / The student should be able to explain concepts The transpiration – process Estimation of the transpiration coefficient and rate – Mechanism of stomatal opening and .closing	theoretical: The transpiration process Estimation of the – transpiration – coefficient and rate Mechanism of stomatal opening and closing practical: Study of – photosynthesis Methods of measuring .photosynthesis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	1 Theory 3 practical	A1/ The student should be able to analyze the process of photosynthesis	theoretical: The process of photosynthesis – the source of the oxygen	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework

		and its mechanisms in chloroplasts.	molecule – light reactions practical: Experiments illustrating the breathing process	on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
eleven th	1 Theory 3 practical	B1 / The student should be able to explain the relationship between photosynthesis and cellular respiration in the metabolic balance of the plant.	Theory: The process – of photosynthesis dark – reactions methods of CO ₂ fixation – factors affecting the process .of photosynthesis practical: Growth measurements: Leaf area – Wet and dry weight	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	1 Theory 3 practical	A1, B1 / The student should be able to explain the process of cellular respiration and its importance in the production of energy for the plant.	theoretical: The .process of respiration Importance – Pyruvic – acid formation .Krebs cycle :practical Measurements of total ,yield, biological yield and yield per plant	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	1 Theory 3 practical	A1, B1 / The student should be able to analyze the role of plant) hormones , auxins , cytokinins , gibberellins , abscisic acid ethylene) in	theoretical: Plant growth regulators :practical Applications of growth regulators in agriculture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

		growth and development.		:My work Assigning tasks and reporting	
fourteenth	1 Theory 3 practical	A1/ The student should be able to assess the impact of environmental and agricultural factors on growth and productivity from a physiological perspective.	theoretical: Plant growth and the factors affecting it practical: Plant tissue culture experiments	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	1 Theory 3 practical	B1 / The student should be able to explain the plant's responses to environmental stresses (drought ,salinity, heat (cold.	theoretical: Plant response to environmental stress – conditions – drought heat stress – low .temperature damage practical: Scientific films about plant . physiology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

227. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

228. Learning and teaching resources

Required textbooks curriculum books, if) (available	
Main references (sources)	Fundamentals of Plant Nurseries and plant propagation
Recommended books and references scientific journals and) (...reports	



Course description template

229. :Course name	
field crops	
230. Course code:	
DES154	
231. semester / year	
First semester	
232. Date of preparation of description	
2024/9/1	
233. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
234. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
235. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Ziad Amer Mustafa :e-mail lec96.Zeyad@ntu.edu.iq	
236. Course objectives	
Goals	1. The student should be able to distinguish between field .crop seeds 2. The student should be able to identify soil service .operations 3. The student should be able to identify crop service .processes
237. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
238. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to explain the concept of field crops and ,their economic nutritional and industrial importance.	Theory: Field Crops Practical: Distinctive plant characteristics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B1 / The student should be able to classify field crops according to ,groups (cereals ,legumes, fibers (oilseeds, fodder.	Theory: Classification of field crops practical: Crop seeds are distinguished	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ B1 / The student should be able to explain the phenological stages of growth in cereal crops ,wheat, barley) (corn.	theoretical: Botanical description of the most important families of field crops :My work Germinating crop seeds	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Fourth	2 Theory 3 practical	B1 / The student should be able to distinguish the environmental requirements (soil, climate) for each group of crops.	:theoretical Environmental factors and their relationship to the growth of field crops practical: Soil service operations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B1 / The student should be able to analyze the basic agricultural processes for growing grain ,crops (plowing ,sowing ,fertilizing (irrigation.	theoretical: Grain cultivation techniques practical: Field training on the sowing process or calibration of a seed drill.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B1 / The student should be able to compare the productive characteristics of legume crops ,beans, lentils) ,chickpeas (soybeans.	:Theoretical Agricultural and nutritional characteristics of legumes. practical: Studying samples of legume seeds and comparing their sizes.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1/ The student should be able to explain the agricultural role of legumes in improving soil fertility through the biological fixation of nitrogen.	theoretical: Root canals and bio-stabilization. practical: Observing root nodules in legume crops under a microscope.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	B1 / The student should be able to analyze the physiological characteristics of fiber crops (cotton, flax) and the requirements for their cultivation.	theoretical: Fiber productivity and quality. practical: Identifying samples of cotton and linen fibers.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1/ The student should be able to distinguish between oil crops ,sunflower) (sesame, canola in terms of needs and productivity.	theoretical: The economic value of oil crops. practical: Extracting vegetable oils using simple methods.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, B1 / The student should be able to explain the morphological and productive characteristics of forage crops (clover, forage) barley, forage (corn, sorghum).	:theoretical Nutritional and production characteristics of animal feed. practical: Identifying fresh and dried forage plant samples.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B1 / The student should be able to explain the impact of agricultural operations (fertilization) irrigation, pest control) on improving crop productivity.	Theory: Integrated agricultural management of crops. practical: An experimental study on the response of a crop to fertilization.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ The student should be able to analyze the production problems and challenges facing field crop cultivation (drought, salinity) (pests).	theoretical: The impact of environmental stresses on crops. practical: Observing signs of stress on plants in the field or laboratory.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1, B1 / The student should be able to apply modern and sustainable agricultural practices in the management of field crops.	:theoretical Sustainable agriculture and resource conservation. :practical Implementing an experimental crop rotation system.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	B1 / The student should be able to design integrated crop management programs to increase production efficiency.	theoretical: Integrated crop management. practical: Developing a plan for managing a specific crop.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B1 / The student must be able to Assessing the impact of climate change and agricultural management on the productivity and quality of field crops.	theoretical: Climate change and smart agriculture. practical: Case study discussion To cultivate a crop(Case Study) under varying climatic conditions.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
239. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
240. Learning and teaching resources	
Required textbooks curriculum) books, if (available	Principles of field crops Dr. Majid Mohsen Al-Ansari, Dr. Abdul Majeed Ahmed Al-Younes
Main references (sources)	Field Crop Production Books by Mohsen Al-Janabi
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

241. :Course name	
geologic	
242. Course code:	
DES155	
243. semester / year	
First semester	
244. Date of preparation of description	
2024/9/1	
245. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
246. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
247. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
248. Course objectives	
Goals	The student should be able to recognize the .1 .science of soil geology and its branches The student should be able to identify the .2 basic branches of geology and the contributions of Arab scientists to earth science . The student should be able to identify the .3 Earth's layers and chemical bonds ,The student should be able to identify crystals .4 .minerals, rocks, and water in nature
249. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

6. Assigning teamwork to reveal leadership .skills

250. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define geology and explain its branches	:theoretical Introduction to Geology. :practical Familiarization with laboratory and field work tools.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, C3/ The student should be able to explain the stages of the Earth's formation and interpret its geological development.	:theoretical The origin and geological evolution of the Earth. :practical Exercises on drawing land sections and their structure.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	The student should be able to distinguish metals according to their physical and chemical properties.	:theoretical Minerals: their definition, physical and chemical properties. :practical	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework

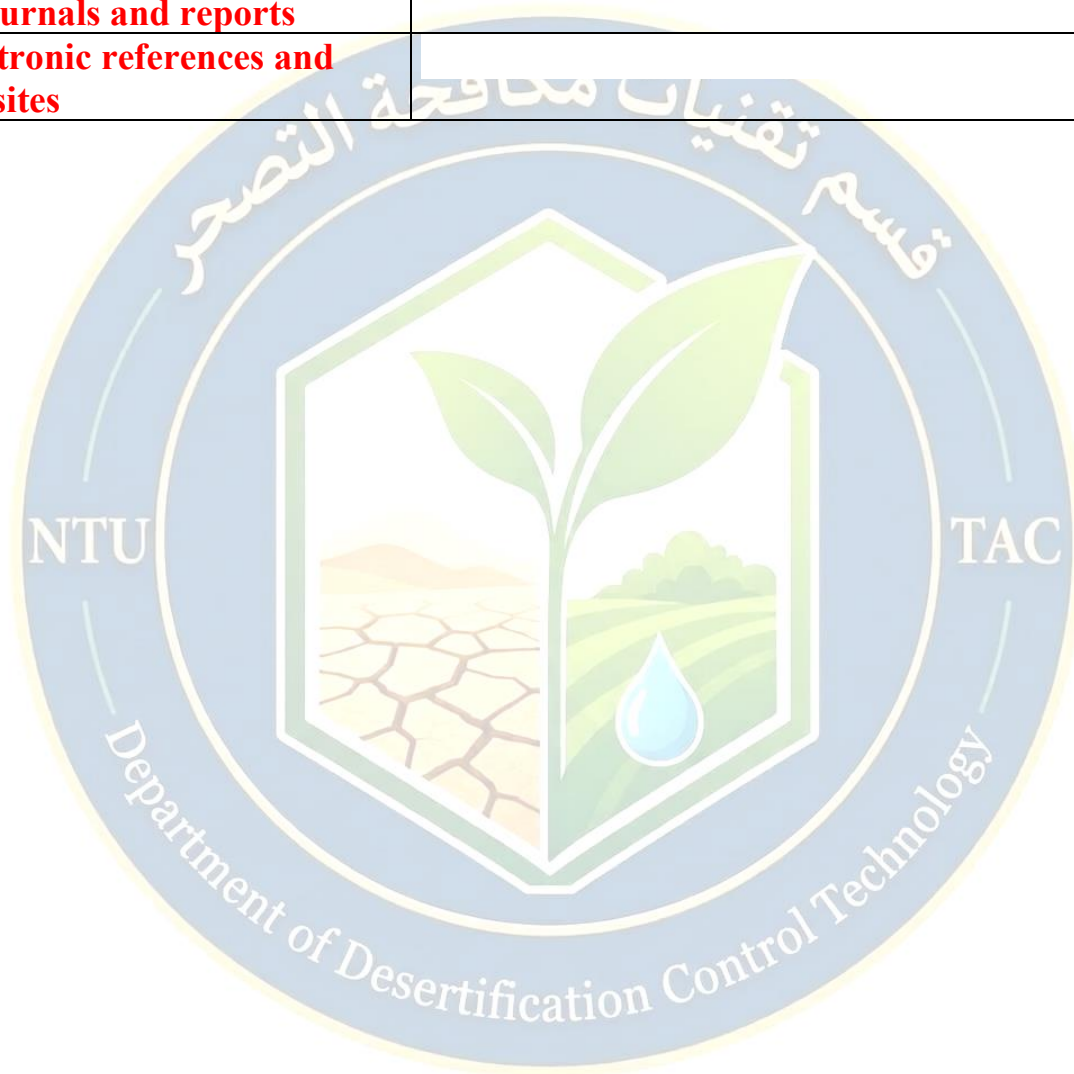
			Identifying simple mineral samples.	direct dialogue :My work Assigning tasks and reporting	,assignments discussions
Fourth	2 Theory 3 practical	The student should be able to classify igneous rocks and explain how they are formed.	:theoretical Igneous rocks: their types, how they are formed, examples. :practical Studying slices of igneous rock under a microscope.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to describe the types of sedimentary rocks and explain the conditions of their formation.	:theoretical :Sedimentary rocks their origin and economic importance. :practical Distinguishing sedimentary samples (limestone, sandstone).	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1/ The student should be able to distinguish between metamorphic rocks and explain their transformation processes.	:theoretical :Metamorphic rocks, definition, examples and properties. :practical Notes on the transformed samples.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Seventh	2 Theory 3 practical	B2 / The student should be able to explain the rock cycle and its relationship to geological processes.	:theoretical The rock cycle and its relationship to geological processes. :practical Diagram of the rock cycle.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B1 / The student should be able to describe the layers of the Earth (crust mantle, core) and their properties.	:theoretical The structure of the Earth's interior (crust mantle, core. :practical Three-dimensional models of the Earth's layers.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, C3/ The student should be able to explain the theory of plate tectonics and link it to the movement of continents.	:theoretical Geomorphology : The internal and external processes affecting the Earth's surface. :practical Analysis of satellite imagery/topographic maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, C3/ The student should be able to analyze the causes of earthquakes and volcanoes and interpret their effects.	:theoretical Plate tectonics and continental drift. :practical Drawing tectonic maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleventh	2 Theory 3 practical	A1, B1 / The student should be able to explain the geomorphological processes that influence the formation of the Earth's surface.	:theoretical Earthquakes and volcanoes: their causes and effects. :practical Studying maps of seismic and volcanic hotspots.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ The student should be able to explain the relationship ,between geology groundwater, and soil.	:theoretical Geomorphology : The internal and external processes affecting the Earth's surface. :practical Analysis of satellite imagery/topographic maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory 3 practical	B2 / The student should be able to distinguish the most important mineral and	:theoretical Mineral and energy ,resources: coal, oil gas. :practical	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework

		energy resources and their economic applications.	Study of economic geological samples.	on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
fourteenth	2 Theory 3 practical	A1/ The student should be able to link geological concepts to ,agricultural environmental and engineering applications.	:theoretical Applied geology in ,agriculture environment and engineering. :practical Field visit/application report.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B1 / The student should be able to integrate his knowledge of geology and employ it in solving applied problems.	General review+ Discussion of + practical reports Final exam.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
251. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
252. Learning and teaching resources					

Required textbooks curriculum books, if) (available	General Geology
Main references (sources)	
Recommended books and references (scientific (...journals and reports	
Electronic references and websites	



Course description template

253. :Course name	
Soil management	
254. Course code:	
DES156	
255. semester / year	
First semester	
256. Date of preparation of description	
2024/9/1	
257. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
258. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
259. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan	
:e-mail Mti.lec224.omar@ntu.edu.iq	
260. Course objectives	
Goals	The student should be able to understand and .1 comprehend matters related to soil formation .factors and processes The student should be able to identify the .2 morphological properties of soil and how to collect soil data from the field, as well as prepare .the samples taken for analysis The student should be able to measure .3 morphological characteristics in the field, such .as color, texture, and moisture The student should be able to measure the .4 – chemical properties of the soil – colloids organic matter – cation exchange capacity – ion . exchange capacityph – EC
261. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion

			5. .Assigning tasks and reporting 6. Assigning teamwork to reveal leadership .skills		
262. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define the concept of soil management and its importance in sustainable agricultural production.	:theoretical What is soil, the purpose of studying it soil science, its branches, the basic components of soil :practical :Soil laboratory definition , tools and equipment used, and definition of occupational safety requirements and conditions that must be applied	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B1 / The student should be able to distinguish ,the physical chemical and biological components of the soil and their role in soil fertility.	:theoretical ,Weathering, its types its factors, and the formation of the parent material :practical Methods of collecting samples, soil type and procedures adopted in , its characterization training on conducting a qualitative description of some morphological characteristics such as color , texture and structure	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

the third	2 Theory 3 practical	B1 / The student should be able to explain the physical processes in the soil such as ,aeration moisture, and heat.	:theoretical Soil formation and development; factors in soil formation :practical Preparing the plant for laboratory procedures and analyses	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory 3 practical	A1, B1 / The student should be able to analyze the chemical reactions in the soil and their effect on the availability of nutrients.	:theoretical Soil morphology, soil structure, soil ,horizons, soil color and other morphological .characteristics :practical ,Physical properties estimation of moisture content , preparation of saturated dough and identification of .its properties	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B1 / The student should be able to evaluate the role of microorganisms in improving soil fertility and recycling elements.	:theoretical The physical properties of the soil and their relationship .to plant growth :practical Apparent density, true .density	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Sixth	2 Theory 3 practical	A1, B1 / The student should be able to identify indicators of soil degradation such ,as salinization compaction, and erosion.	:theoretical The physical properties of the soil and their relationship .to plant growth :practical Mechanical analysis of soil using the absorbent and hydrogen methods to . estimate texture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	A1, B1 / The student should be able to explain methods of combating soil degradation and maintaining its productivity.	:theoretical The liquid phase of soil, the relationship between soil and water, water constants, soil water .classification :practical Training on preparing standard solutions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B1 / The student should be able to apply methods of soil sample analysis in the laboratory to assess its fertility.	:theoretical Soil colloids, clay .minerals :practical Training on the preparation of soil suspensions and .extracts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	B1 / The student should be able to compare organic and chemical	:theoretical Chemical properties of the soil, soil reactivity, ion	:Theoretical Auditory :methods the method	Short ,quizzes

		fertilizers and their role in soil management.	exchange, cation . exchange capacity :practical Chemical properties ,of the soilpH andEC	of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	homework ,assignments discussions
tenth	2 Theory 3 practical	A1/ The student should be able to develop integrated fertilization strategies to increase the efficiency of nutrient utilization.	:theoretical Organic matter in the ,soil, its sources ,importance components, and .decomposition :practical ,Organic matter calcium carbonate	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B1 / The student should be able to explain methods of improving the physical properties of the soil (such as adding organic amendments and agricultural (gypsum.	:theoretical Soil salinity, sources of salinization, causes ,of salinity classification of saline soils , reclamation of saline soils, salinity .testing...etc :practical Estimating some ,nutrients in the soil .potassium, sodium	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B1 / The student should be able to analyze the role of irrigation and drainage techniques in soil management and	:theoretical Soil fertility, macro ,and micronutrients ,their importance sources, and symptoms of .deficiency :practical	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

		maintaining its fertility.	Dynamic properties of .soil	direct dialogue :My work Assigning tasks and reporting	
thirteenth	2 Theory 3 practical	A1, B1 / The student should be able to evaluate agricultural practices (crop ,rotation, tillage plant cover) in improving the soil .	:theoretical The relationship ,between soil, water .and plants :practical Identifying the types of fertilizers and .fertilization methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1/ The student should be able to discuss the role of sustainable soil management in addressing climate change.	:theoretical Soil classification :practical Conducting an experiment in the .field of soil biology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B1 / The student should be able to prepare an integrated soil management plan in a specific agricultural system.	:theoretical Iraqi soil :practical Using information technology in the study and ,classification of soil and reviewing reports .submitted by students	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
263. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
264. Learning and teaching resources					
Required textbooks curriculum books, if (available					
Main references (sources)					
Recommended books and references (scientific journals (...and reports					
Electronic references and websites					



Course description template

1. :Course name	
English language (2)	
2. Course code:	
NTU200	
3. semester / year	
4. Date of preparation of description	
2024/9/1	
5. Available forms of attendance	
1. Weekly lesson schedule (theory) .(2. Discussions, scientific seminars, and other extracurricular activities	
6. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
7. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi	
:e-mail omar.ah.f@ntu.edu.iq	
8. Course objectives	
Goals	1. The student should be able to recognize all the .skills and knowledge of the English language 2. The student should be able to encourage and develop scientific research in the fields of English . language in general 3. The student should be able to cooperate with local and international organizations in the field of .English language development
9. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills
10. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first the second	2 Theory	A2, B1 / Parts of speech, sentence and phrase in ,English comprehension	Speech parts, sentences in English, comprehension	The discussion method and the lecture method	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A2, B1 / The student should be able to identify ,proper nouns ,indefinite nouns ,nouns of matter ,plural nouns ,abstract nouns countable and uncountable nouns, and articles of definiteness and .indefiniteness	Proper, common, material, collective, abstract, countable and uncountable nouns, a, an, the.	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Fourth + Fifth	2 Theory	A2, B1 / The student should be able to identify pronouns, their ,types: personal accusative and ,genitive ,possessive ,reflexive ,demonstrative relative pronouns and interrogative pronouns	Pronouns: types, personal (subject, objective), possessive, reflexive, demonstrative, interrogative, and relative pronouns.	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A2, B1 / The student should be able to identify auxiliary verbs and their types	Auxiliary verbs, types	Discussion ,method lecture method	Short ,quizzes homework

					,assignments discussions
Seventh	2 Theory	A2, B1 / The student should be able to identify tenses in the :active voice :simple tense ,present, past future	Tenses in active voice case: simple tense: present, past, future	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A2, B1 / The student should be able to identify the continuous ,tense: present past, future	Continuous tense: present, past, future	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A2, B1 / The student should be able to identify :the perfect tense ,present, past continuous	Perfect tense: present, past, future	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A2, B1 / The student should be able to know The perfect :continuous tense ,present, past future	Continuous perfect tense: present, past, future	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions

eleven th + twelfth	2 Theory	A2, B1 / The student should be able to know :Adjectives ,proper nouns possessive ,adjectives descriptive adjectives, long adjectives, short	Adjectives: names, possessive, descriptive, long, and short adjective. Comparison and similarity	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
thirteen nth + fourteen nth	2 Theory	A2, B1 / The student should be able to identify sounds in the :English language ,consonants vowels	English sounds: constants, vowels	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions
fifteen th	2 Theory	A comprehensive review of all the material's vocabulary	Review of the article	Discussion ,method lecture method	Short ,quizzes homework ,assignments discussions

11. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

12.Learning and teaching resources

Required textbooks curriculum books, if (available	Rapid Review
Main references (sources)	English Grammar
Recommended books and references (scientific (...journals and reports	Eurasea Article
Electronic references and websites	Lib.gin

Course description template

13.:Course name	
Computer Principles (2)	
14. Course code:	
NTU201	
15. semester / year	
First semester	
16. Date of preparation of description	
2024/9/1	
17. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
18. Number of credit hours (total) / Number of units (total)	
hours (1 theory + 1 practical)* 15 weeks 30	
19.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Manhal Muhammad Bashir :e-mail manhalbasher@ntu.edu.iq	
20. Course objectives	
Goals	– define the calculator The student should be able to .1 - calculator generations – hardware components and software - the most important The student should be able to identify .2 - basic information about computers, computer generations, and .operating systems - The student should be able to understand .3the MS-DOS ,operating system , the concept of the system, the system signal - disks, directories and their levels, their files, and internal and .external commands
21.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
22. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	1 Theory 1. My work	A2, B1 / The importance of computers in our daily and economic lives Knowledge of information technology and learning about computer parts and components	Introduction to Computers Basic concepts in information technology Computer system information technology Types of computers computer parts Input and output units memory CPU	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	1 Theory 1. My work	A2/ Identifying computer hardware and memory types	Equipment Computer and logic units Recorders control unit Input unit Abscess units Memory, storage, and performance Main types of memory	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

the third	1 Theory 1. My work	/ B1 Understanding how data is represented, what units of ,measurement are knowledge of software and compilers, and understanding the types of operating systems	Data representation in memory Memory measurement unit Secondary memory and its types Data storage in memory Computer performance software Systems software programming) (languages ,Translations interpreters, operating systems Types of operating systems Application software	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	1 Theory 1. My work	Exam regarding the subject	Theoretical Exam (1)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fifth	1 Theory 1. My work	A2, B1 / Getting to know Windows windows	Windows ,Using the mouse minimizing and ,maximizing windows closing windows	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	1 Theory 1. My work	/A2 Understanding window movement and control methods	Moving windows from one place to another, controlling ,window size, taskbar date and time	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	1 Theory 1. My work	B1 / Identifying the main Windows icons	StartMenu ProgramsPrograms My Documents	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Eighth	1 Theory 1. My work	/ A2, B1 Identifying non-essential shortcut icons	Desktop Create a shortcut icon for an application or file Recycle Bin Windows Explorer Formatting floppy disks	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	1 Theory 1. My work	B1 / Identifying the operations performed on the file	File organization ,Select, choose folder ,create folder, rename ,delete file, copy file move file	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	1 Theory 1. My work	A2/ Explanation of screen and mouse settings	Screen settings Stop screen Change mouse pointer Mouse speed control Double-tap speed control	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

eleven th	1 Theory 1. My work	/ A2, B1 Knowing how to install and uninstall programs from the hard drive	Installing and ,uninstalling programs ,disk information requesting assistance	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	1 Theory 1. My work	Exam regarding the subject	Monthly exam (2)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen th	1 Theory 1. My work	A2/ Knowledge and practical application	/ Calculator / Notepad Notebook / Using the notepad to edit and create the file Painter / Screen Components	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

fourteenth	1 Theory 1. My work	/ A2, B1 Understanding how to create and manage graphics	/ Creating graphics Setting foreground / colors Background / Choose brush size / Select drawing tool Save drawing / Set drawing as desktop background / Exit Paint (Entertainment ProgramsMedia player	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	1 Theory 1. My work	/ A2, B1 Identifying types of viruses and methods of protection against them	Viruses / Reason for the name / Definition Ways of virus / / transmission Symptoms of virus infection / Methods of protection / Types of viruses / Computer crimes Theft / Hackers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
23. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
24.Learning and teaching resources					
Required textbooks curriculum) books, if (available		Metzeelaer and Scharpf /Benjamin/Cummings Pub. 1995			
Main references (sources)		The library, scientific websites on the internet, access to lectures from other universities			
Recommended books and references		The Internet			

scientific) journals and (...reports	
Electronic references and websites	



Course description template

25.:Course name	
Arabic language	
26. Course code:	
NTU202	
27. semester / year	
2024/9/1	
28. Date of preparation of description	
29. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
30. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
31.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Amna Maher Aziz	
:e-mail amina.mahir@ntu.edu.iq	
32. Course objectives	
Goals	The student should be able to understand and comprehend .1 .matters related to the chemical properties of soil The student will be able to choose the extent to which the .2 factors affecting knowledge and study of the most important .chemical reactions that occur in the soil are appropriate The student should be able to identify and understand the .3 basics of detecting the type of minerals that control .dissolution and precipitation The student should be able to identify the factors affecting .4 .chemical reactions
33.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
34. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory	A1. Identifying the types of .linguistic errors / B1 Differentiating between the open taa and the closed taa	Introduction to linguistic errors – the closed and open taa	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A1/Distinguishing between writing the long alif and the short alif, and the positions for writing both alifs /A2 Differentiating between solar and lunar letters	Rules for writing the – long and short alif solar and lunar letters	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	/A1 Differentiating ض and ظ	ض and ظ The letters	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A1, B2 / Enabling the student to write the hamza correctly	Writing the hamza	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory	/ A1, B2 Recognizing and writing punctuation marks in their correct positions	punctuation marks	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A1/ Identifying nouns and verbs and stating the sign of each /A2 Differentiating between nouns and verbs B1 / Statement of types of verbs B2 Distinguishing/ between types of verbs	Noun and verb, and the difference between them	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	/ A1, B2 Identifying and differentiating between types of objects	Objects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Eighth	2 Theory	A1, A2/ Enabling the student to write numbers correctly	number	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	/ A1, B2 Identifying Common linguistic errors and how to avoid them	Applications for common grammatical errors	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	/ A1, B2 Identifying Common linguistic errors and how to avoid them	Applications for common grammatical errors	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	/A1 Differentiating between Noon and Tanween B1 /Recognizing the meanings of prepositions	The letters Nun and Tanween - Meanings of Prepositions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory	/ A1, B2 Identifying Formal aspects of administrative discourse	Formal aspects of administrative discourse	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	/A1 Understanding the language of administrative discourse	Administrative discourse language	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	/A1 Understanding the language of administrative discourse	Administrative discourse language	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	/ A1, B2 Identifying examples of administrative correspondence	Models From administrative correspondence	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
35. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
36.Learning and teaching resources	
Required textbooks curriculum) books, (available if	:Required books General Arabic Language Curriculum for Technical Dr. Safaa Kadhim Makki and Dr. Lama by) Universities (Muhammad Younis
Main references (sources)	5- Clear Dictation: Abdul Majeed Al-Nuaimi, Daham Al-Kayyal, Dar Al-Mutanabbi Library, Baghdad, 6th edition .AD 1987 6- Lessons in language, grammar and spelling for state employees: Ismail Hamoud Atwan and others, Ministry of .Education Press No. (3), Baghdad, 2nd edition, 1984 AD 7- :Arabic Language for the Third Intermediate Grade .Fatima Nazim Al-Atabi, and others, 1st Edition, 2018 AD 8- General Arabic Language for Non-Specialized Departments: Abdul Qadir Hassan Amin and others, Ministry ,of Higher Education and Scientific Research, 2nd Edition .AD 2000 Inspired by Arabic literature: Hawal Muhammad Amin, Al-.Saadoun Press, Baghdad
Recommended books and references scientific) journals and (...reports	Lessons in language, grammar and spelling for state employees, Ismail Hamoud Atwan and others, Ministry of Education Press No. (3) Baghdad, 2nd .edition, 1984 AD
Electronic references and websites	

Course description template

37.:Course name	
Crimes of the Ba'ath regime in Iraq	
38. Course code:	
NTU203	
39. semester / year	
First semester	
40. Date of preparation of description	
2024/9/1	
41. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
42. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
43.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Ahmed Fares Al-Sawaf :e-mail ahmedalsawaf@ntu.edu.iq	
44. Course objectives	
Goals	The student should be able to understand and comprehend .1 the basic concepts related to the definition of crimes, their .types and categories define the crimes and The student should be able to .2 violations of the former regime and the types of .international crimes define the crimes of mass The student should be able to .3 .graves and violations of Iraqi laws address environmental The student should be able to .4 crimes, urban destruction, demographic change policies, and .extrajudicial detention
45.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills

46. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory	:A1, B2 / Theory The student should be able to understand the concept of crimes and their categories.	:theoretical Crimes of the Ba'ath regime according to the Iraqi High Criminal Court Law of 2005 The concept of crimes and their categories ,Definition of crime linguistically and technically	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	:A2, B2 / Theory The student should be able to identify the crimes of the Ba'ath regime according to the International Criminal Court.	:theoretical Crime Departments Crimes of the Ba'ath regime according to the documentation of the Iraqi High Criminal Court Law of 2005	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	:A1, B2 / Theory The student should be able to identify the types of international crimes.	:theoretical Types of international crimes Decisions issued by the Supreme Criminal Court	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	/ A1, B1 Theoretical: The student should be able to distinguish between psychological and social crimes.	:theoretical Psychological and social crimes and their effects Psychological crimes Mechanisms of psychological crimes Effects of psychological crimes	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory	:A1, B2 / Theory The student should be able to identify social crimes and the Ba'ath regime's stance on religion	:theoretical Social crimes Militaryization of society The Ba'ath regime's stance on religion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	:A2, B2 / Theory The student should be able to define and describe violations of Iraqi laws	:theoretical Violations of Iraqi laws Images of human rights violations and crimes of authority	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	/ A1, B1 Theoretical: The student should be able to identify decisions regarding political and military violations	:theoretical Some decisions regarding the political and military violations of the Ba'ath regime	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	:A1, B2 / Theory The student should be able to identify prison and detention centers	:theoretical Prisons and detention centers of the Ba'ath regime	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Ninth	2 Theory	:A1, B2 / Theory The student should be able to identify environmental crimes committed by the Ba'ath regime.	:theoretical Environmental crimes of the Ba'ath regime in Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A1 / Theory: The student should be able to understand war pollution and mine explosions	:theoretical War and radioactive pollution and landmine explosions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	:A2, B1 / Theory The student should be able to recognize the scorched earth policy.	:theoretical destruction of cities and villages scorched earth policy	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	:A1, B2 / Theory The student should be able to identify how palm groves are cleared	:theoretical draining the marshes Demolition of palm groves, trees and crops	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory	:A1, B2 / Theory The student should be able to identify mass graves.	:theoretical Mass grave crimes Definition of mass graves	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework assignments discussions
fourteenth	2 Theory	B2 / Theory: The student should be able to identify mass graves created by the Ba'athist regime	:theoretical The events of the mass graves and genocide committed by the Ba'athist regime	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework assignments discussions
fifteenth	2 Theory	A1/ Theory: The student should be able to classify the chronologically of genocide graves.	:theoretical Chronological classification of genocide graves in Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework assignments discussions
47. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
48.Learning and teaching resources					
Required textbooks curriculum) books, (available		if			

Main references (sources)	Books on crime , criminal law , and human rights are available in the college library and the university's central .library
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	.Human rights websites



Course description template

49.:Course name	
Professional ethics	
50. Course code:	
NTU204	
51. semester / year	
First semester	
52. Date of preparation of description	
2025/7/1	
53. Available forms of attendance	
1. .(Weekly lesson schedule (theory) 2. Discussions, scientific seminars, and other extracurricular activities	
54. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
55.Name of the course coordinator (list all names, if there is more than one)	
Name: Dr. Ahmed Fares Al-Sawaf :e-mail ahmedalsawaf@ntu.edu.iq	
56. Course objectives	
Goals	1. Introducing students to the concepts of occupational safety ,and health and their importance in protecting people property and the environment. 2. ,Identifying the types of hazards (electrical, mechanical chemical, physical, biological...) and methods of preventing them. To provide students with knowledge of local and international regulations and laws related to occupational safety and health.
57.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Dialogue and discussion 4. .Assigning tasks and reporting 5. .Assigning teamwork to reveal leadership skills
58. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory	:A1, B2 / Theory The student should be able to define ethics and law.	:theoretical Ethics and Law	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	B2 / Theory: The student should be able to define ethics and conduct ethical analysis.	:theoretical Ethics and moral analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A1 / Theory: The student should be able to define ethics and professions.	:theoretical Ethics and professions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	:A1, B2 / Theory The student should be able to recognize privacy and civil liberties.	:theoretical ,Anonymity, security privacy, and civil liberties	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory	:Part 3/ Theory The student should be able to recognize intellectual property rights and computer technology.	:theoretical Intellectual property rights and computer technology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	:A1/ Theoretical The student should be able to define the concept of cybercrime and Iraqi law	:theoretical The concept of cybercrime and the corresponding Iraqi law	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	:b/Theoretical The student should be able to identify the types of attacks on computer systems	:theoretical Types of attacks on computer systems	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	theoretical: exam	:theoretical exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Ninth	2 Theory	:A1, B2 / Theory The student should be able to identify the motives behind .cybercrimes	:theoretical Motives for cybercrime	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	:A1/Theoretical The student should be able to recognize the social costs and .consequences	:theoretical Costs and social consequences	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	:Part 3/ Theory The student should be able to understand strategies for preventing .computer crimes	:theoretical Computer crime prevention strategies	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory 3 practical	:A1, B2 / Theory The student should be able to define cybercrime law	:theoretical Iraqi Cybercrime Law	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	B2 / Theory: The student should be able to define The concept of cybercrime and the corresponding Iraqi law	theoretical: The concept of cybercrime and the corresponding Iraqi law	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	:A1/ Theoretical The student should be able to define Costs and social consequences	theoretical: Costs and social consequences	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	:A1, B2 / Theory The student should be able to define Motives for cybercrime	theoretical: Motives for cybercrime	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
59. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
60.Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

61.:Course name	
Organic Chemistry	
62. Course code:	
TAMO201	
63. semester / year	
First semester	
64. Date of preparation of description	
2024/9/1	
65. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
66. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
67.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi	
:e-mail omar.ah.f@ntu.edu.iq	
68. Course objectives	
Goals	1. To instill in the student an awareness of the importance of organic chemistry on the industrial and agricultural levels 2. To provide the student with a broad and balanced .foundation of knowledge and skills in organic chemistry 3. Developing the student's ability to apply their chemical knowledge and skills in solving theoretical and practical problems in chemistry that serve the goals of sustainable .development
69.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
70. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	A1/ Theory: The student learns about the concept of organic chemistry and its importance in various fields of .life :B1 / Practical The student determines the melting point	Theory: General principles of organic . chemistry practical: Determine the melting point.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ Theory: The student becomes familiar with the , specific meaning ,nomenclature .and interactions Alkanes :B1 / Practical The student determines the .boiling point	theoretical: Saturated) hydrocarbons (alkanes practical: Setting the boiling point	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ Theory: The student learns about the types of alkenes and how .to prepare them :B1 / Practical The student uses a simple distillation .apparatus	:theoretical Unsaturated) hydrocarbons (alkenes practical: Purification of liquid organic compounds by simple distillation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	A/ Theory: The student understands the types of reactions specific to alkenes. And the reactions :B1 / Practical The student learns about the types of solvents used for . recrystallization	theoretical: Alkene reactions and diene types :practical + Recrystallization Scientific Visit	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1/ Theory: The student learns about the types of alkynes in terms of nomenclature and method of .preparation :B1 / Practical The student learns about the process of purifying organic compounds using the sublimation .method	) theoretical: Alkynes (acetylenes practical: sublimation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Sixth	2 Theory 3 practical	A1/ Theory: The student learns about the physical and chemical properties of aromatic compounds and how to name them. :B1 / Practical The student performs a practical procedure on how to extract solid and liquid organic compounds using solvent extraction.	Theory: Properties and Nomenclature of Aromatic Compounds practical: Solvent extraction	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	A1/ Theory: The student understands the methods of preparing aromatic compounds and the types of reactions they undergo. :B1 / Practical Preparation of methane gas in the laboratory	:theoretical Preparation and reactions of aromatic compounds practical: Methane gas preparation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Eighth	2 Theory 3 practical	A1/ Theory: The student learns about the properties and nomenclature of alcohols and phenols :B1 / Practical The student learns how to prepare biotin	theoretical: Properties and nomenclature of alcohols and phenols practical: Biotin preparation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1/ Theory: The student becomes familiar with the methods of preparing and reacting alcohols and phenols :B1 / Practical The student carries out a practical application by preparing acetylene gas	:theoretical Preparation and reactions of alcohols and phenols practical: Preparation of acetylene gas	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1/ Theory: The student learns about ethers , how ,to prepare them and the types of reactions they .undergo :B1 / Practical The student performs a practical application to detect types of .alcohol	theoretical: ethers practical: Study of the properties of alcohols	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ Theory: The student learns how to name and .prepare aldehydes :B1 / Practical The student performs a practical application on how to distinguish between aldehydes. and ketones	,Theory: Preparation Nomenclature, and Reactions of Aldehydes practical: Aldehyde detection reaction and ketones	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	:A1/ Theoretical The student learns ,how to name react with, and .prepare ketones :B1 / Practical The student performs a practical procedure on how to prepare acetone	:theoretical ,Preparation nomenclature, and reactions of ketones practical: Preparing acetone	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1/ Theory: The student learns about carboxylic acids and studies their chemical .properties :B1 / Practical The student experiences a practical application of how to prepare .propanoic acid	theoretical: Properties and nomenclature of carboxylic acids practical: Preparation of propanoic acid	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1/ Theory: The student understands the types of reactions and methods of preparing .carboxylic acids :B1 / Practical The student applies how to prepare propanedalddehyde	theoretical: Reactions and preparation of carboxylic acids practical: Preparation of propanaldehyde	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1/ Theory: The student understands the importance of amines :B1 / Practical The student is familiar with methods of detecting elements	theoretical: The trustees practical: Revealing the elements	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

71. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
72.Learning and teaching resources	
Required textbooks curriculum) books, (available if	Organic Chemistry, by Prof. Dr. Salem Hamed Hussein, Prof. Dr. Sami Abdul Ali, Asst. Prof. Khaled Fathi Al-Shahri / University of Mosul (2013), Dar Al-Kutub for Printing and Publishing
Main references (sources)	Organic Chemistry, authored by : Dr. Badi ' Ali Ahmed, Dr. Salem Hamed, and Mr. Khaled Fathi Al-Shahri. Printed at the University of Mosul Press (1991)
Recommended books and references scientific) journals and (...reports	.Principles of Organic Chemistry , by Professor Dr Mohamed Magdy Wasel / Cairo .Fundamentals of Organic Chemistry , by Prof. Dr Mohamed Magdy Wasel
Electronic references and websites	https://arabian-chemistry.com https://scholar.google.com

Course description template

73.:Course name	
Agricultural statistics	
74. Course code:	
TAMO202	
75. semester / year	
First semester	
76. Date of preparation of description	
2024/9/1	
77. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
78. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
79.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Asaad Ibrahim Mustafa	
:e-mail	
80. Course objectives	
Goals	1. The student should be able to define the . science of statistics 2. To be able to understand methods of measuring variance, means, andF, T, and Z tests 3. The student should be able to know how to find differences and averages when . conducting statistical comparisons
81.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. Assigning teamwork to reveal leadership .skills
82. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	A1/ Theory: The student should be able to define the principle of .statistics :B1 / Practical Solving mathematical exercises and problems in statistics	Theory: Introduction to Statistics Practical exercises: on the principles of statistics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	:A1, A2/ Theory The student should be able to recognize statistical .symbols :B2 / Practical The student should be able to solve statistical .exercises	theoretical: Statistical symbols practical: Statistical symbols exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	:A1/Theoretical The student should be familiar with the topic of frequency .distribution :B1 / Practical The student should be able to solve frequency distribution .exercises	theoretical: Frequency distribution table practical: Exercises on frequency distribution tables	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	A1/ Theory: The student should be able to interpret the ascending and descending frequency .distribution table :B1 / Practical The student should be able to solve exercises on the topic of ascending and descending frequency .distribution	theoretical: Ascending and descending frequency distribution table practical: Exercises on ascending and descending frequency distribution tables	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1/ Theory: The student should be able to understand and comprehend ,the curve histogram, and frequency .polygon :B2 / Practical The student should be able to ,construct curves histograms, and frequency .polygons	,theoretical: Curve histogram, and repetition polygon :practical Exercises for constructing ,curves, histograms and frequency polygons	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Sixth	2 Theory 3 practical	:A1/ Theoretical The student should be able to define the mean .scale :B1 / Practical The student should be able to solve multiple exercises on the topic of the .mediation scale	:theoretical mediation scale :practical Exercises on the scale of moderation and dispersion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	monthly exam	theoretical: Monthly exam 1 practical: Monthly exam 1	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Eighth	2 Theory 3 practical	:A1/ Theoretical The student should be able to understand the basics of standard .grading :B1 / Practical The student should be able to understand methods for solving arithmetic problems related to commutation and combinations	theoretical: Standard degree, probability practical: Exercises of ,permutation ,combinations standard score	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	:A1/ Theoretical The student should be able to understand and comprehend the normal distribution method and test statistical .hypotheses :B1 / Practical The student should be able to Solve various exercises on the topic of normal distribution	theoretical: Normal distribution and hypothesis testing practical: Normal distribution exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	:A2/ Theory The student should be able to understand what a T -test is. :B2 / Practical The student should be able to identify the best methods for calculating theT - test.	:theoreticalT test :practicalT test exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	:A1/ Theoretical The student should be able to understand what theZ test is. :B1 / Practical The student should be able to identify the best methods for calculating theZ - test.	:TheoryZ Test :practicalZ Test Exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory 3 practical	:A1/ Theoretical The student should be able to define correlation and regression and what the characteristics of .each are :B1 / Practical The student should be able to Solving mathematical problems related to the topics of correlation suicide	:theoretical Correlation and regression practical: Correlation and regression exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory 3 practical	Monthly exam 2	Monthly exam 2	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

fourteenth	2 Theory 3 practical	A1/ Theory: The student should be able to understand and comprehend the concepts of chi-square and its .uses :B1 / Practical The student should be able to Solving statistical problems on topic X2	theoretical: chi-square test :practical X2 Test Exercises	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	monthly exam	monthly exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
83. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
84.Learning and teaching resources					
Required curriculum (available textbooks books, if)			Principles of Statistics, Dr. Khashaa Al-Rawi, 2000		
Main references (sources)			Reliance on the prescribed curricula issued by the Ministry Relying on curricula prepared by the subject teacher		

Recommended books and references (scientific journals (...and reports	Reliance on the prescribed curricula .1 issued by the Ministry Relying on the curricula prepared by the .2 subject teacher
Electronic references and websites	Reliance on the prescribed curricula .1 issued by the Ministry Relying on the curricula prepared by the .2 subject teacher



Course description template

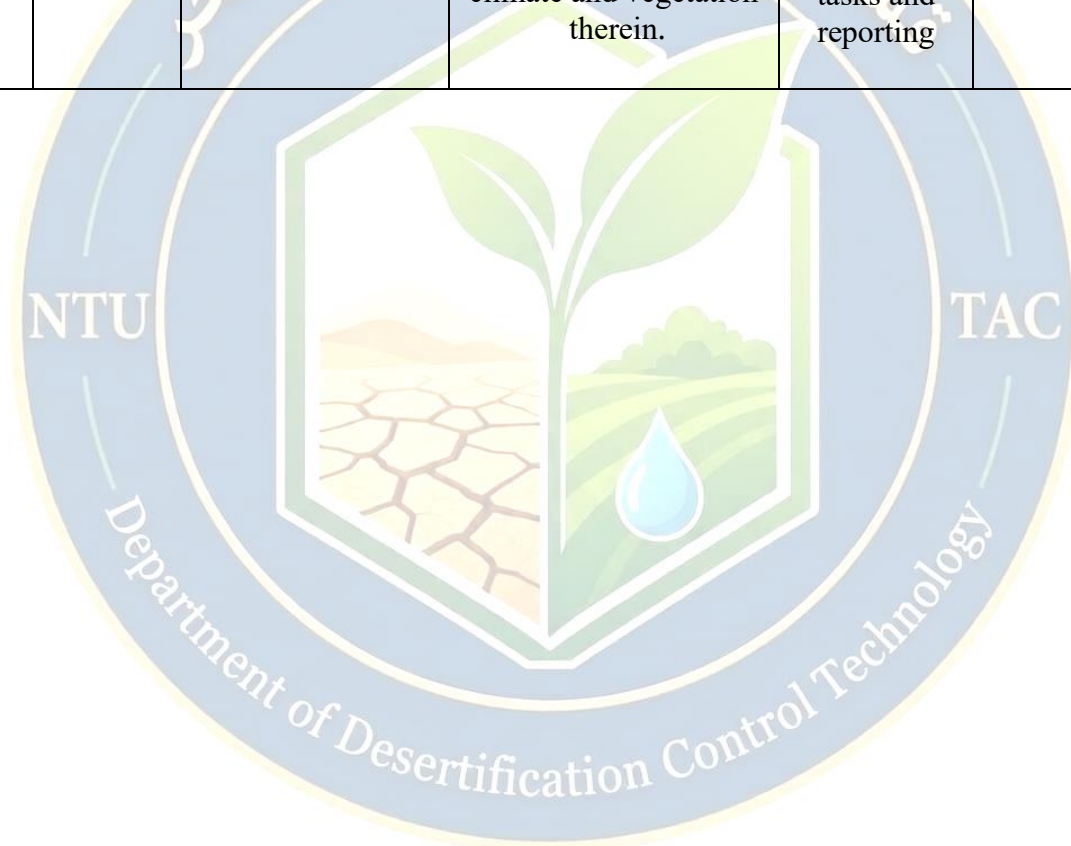
85.:Course name	
dry farming	
86. Course code:	
DES201	
87. semester / year	
First semester	
88. Date of preparation of description	
2024/9/1	
89. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
90. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
91.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Mohamed Salem Ahmed :e-mail mohameedsa66 @ntu.edu.iq	
92. Course objectives	
Goals	The student should be able to understand and .1 comprehend matters related to arid regions and .their nature The student should be able to identify .2 .available technologies for combating drought The student should be able to identify the .3 nature and types of plants and the extent of their .impact on the environment of these regions
93.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. Assigning teamwork to reveal leadership .skills

94. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	A1, B2 / The student should be able to define drought and the nature of dryland :agriculture drought and arid and semi-arid regions, the nature of drought ,and its causes and dry regions .in the world	theoretical: Drought and the nature of :dryland agriculture Drought and arid and semi-arid regions, the nature of drought and its causes, dry regions of the world :practical The nature of rainfed agriculture: An introduction to rainfed areas in Iraq and an explanation of the climate and vegetation therein.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
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the second	2 Theory 3 practical	A1, B2 / The student should be able to identify the factors affecting production in dryland agriculture: the plant, the soil, the climate, the temperature, the light energy, the atmospheric pressure, the wind, the rainfall Cloud condensation and rainfall in agricultural fields: methods of implementation requirements for implementing the condensation process, existing uses of cloud condensation and rainfall	theoretical: Factors affecting production in :dryland agriculture ,plant, soil, climate temperature, light energy, atmospheric ,pressure, wind .rainfall Cloud condensation and rainfall in :agricultural fields methods of ,implementation requirements for implementing the ,condensation process existing uses of cloud condensation and .rainfall :practical A documentary film was shown about the tasks and studies of the International Center for Agriculture) in Dry Areas ICARDA .(	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
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the third	2 Theory 3 practical	A1, B2 / The student should be able to understand and comprehend the climatic classification of :the Arab world agricultural climatic regions ,in the Arab world The role of water :in plant growth the importance of ,water for plants factors affecting water absorption ,by plants transpiration	theoretical: Climate classification of the :Arab world Agricultural climate regions in the Arab ,world The role of water in plant growth: the importance of water for plants, factors affecting water ,absorption by plants transpiration :practical The plants are divided into groups according to their resistance to water stress, and the environmental factors that affect the plant's .need for water	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory 3 practical	A1, B2 / The student must be able to Explaining the concept of drought (water stress): its effects on plants, and plant adaptation .to water stress	theoretical: Drought (water stress): its effects on plants, plant adaptation to water stress :practical Methods for measuring plant resistance to water .stress	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory 3 practical	monthly exam	monthly exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B2 / The student should be able to explain the concept Drought and the nature of dryland :agriculture Drought and arid and semi-arid regions, the nature of drought ,and its causes dry regions of the world	Theory: Drought and the Nature of Dryland Agriculture: Drought and arid and semi-arid regions, the nature of ,drought and its causes dry regions of the world :practical Diagnosis of individual factors causing hydrotensile resistance	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1, B2 / The student should be able to understand drought (water stress): its effects on plants, and plant adaptation to water stress	theoretical: Drought (water stress): its effects on plants, plant adaptation to water stress :practical The importance of organic materials in ,rainfed agriculture and the reasons for the shortage of organic materials in rainfed .agricultural areas	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B2 / The student must be able to The term crop breeding under dry farming conditions is explained Field operations and agricultural mechanization in ,dryland farming	theoretical: Crop cultivation under dry farming conditions Field operations and agricultural mechanization in ,dryland farming :practical Investment elements in rainfed agriculture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, B2 / The student must be able to Knowledge of the appropriate equipment and machinery for crop production in dryland agriculture	theoretical: Equipment and machinery suitable for crop production in dry farming :practical :Rainfed agriculture ,nursery preparation ,sowing, harvesting advantages and justifications for practicing limited and .unlimited agriculture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	monthly exam	monthly exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B2 / The student must be able to Understanding and comprehending agricultural processes in dry ,farming fertilization under dry farming conditions Pests in dry ,farming, weeds insects	Theory: Agricultural operations in dry farming, fertilization under dry farming conditions ,Pests in dry farming weeds, insects :practical Human errors and their impact on erosion, and methods of erosion resistance .and soil conservation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory 3 practical	A1, B2 / The student should be able to explain the concept of moisture conservation and :soil maintenance factors affecting soil moisture ,conservation methods used in moisture ,conservation methods of protecting soil from erosion, and the damage .caused by erosion	theoretical: Soil moisture conservation :and maintenance Factors affecting soil ,moisture retention methods used for ,moisture retention methods for protecting ,soil from erosion damage caused by erosion :practical Conservation agriculture, its ,definition, methods benefits of following the conservation ,agriculture method requirements for its implementation, a presentation of extensive applied experiences in the Arab world in general .and Iraq in particular	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory 3 practical	A1, B2 / The student must be able to Definition of farming in dryland :agriculture Traditional ,farming mechanized farming, modern ,trends in farming mulching, stubble mulch farming , minimum tillage	theoretical: Dryland farming: Traditional farming, mechanized farming, modern ,farming trends mulching stubble , mulch farming , minimum tillage :practical Pasture and livestock development in rainfed agriculture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

fourteenth	2 Theory 3 practical	A1, B2 / The student must be able to Knowledge of the appropriate equipment and machinery for crop production in dryland agriculture	theoretical: Equipment and machinery suitable for crop production in dry farming :practical Documentary films from the International Center for Dry Areas .were shown	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B2 / The student must be able to Understanding and comprehending the term "climatic classification" for :the Arab world agricultural climatic regions in the Arab world The role of water :in plant growth the importance of ,water for plants factors affecting water absorption ,by plants transpiration	theoretical: Climate classification of the :Arab world Agricultural climate regions in the Arab ,world The role of water in plant growth: the importance of water for plants, factors affecting water ,absorption by plants transpiration :practical Examples of ideal crop rotations for arid regions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

95. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

96.Learning and teaching resources

Required textbooks (curriculum books, if available)	Lectures prepared by the course instructor
Main references (sources)	Dry farming, its foundations, elements and investment / Dr. Abdullah Qasim

Recommended books and references (scientific journals (...and reports	
Electronic references and websites	



Course description template

97.:Course name	
remote sensitization	
98. Course code:	
DES202	
99. semester / year	
First semester	
100. Date of preparation of description	
2024/9/1	
101. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
102. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
103. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Manhal Muhammad Bashir :e-mail manhalbasher@ntu.edu.iq	
104. Course objectives	
Goals	1. The student should be able to explain the theoretical foundations of remote sensing science and the principles of electromagnetic radiation and its interaction with objects and surfaces. 2. The student should be able to distinguish between the types of sensors and satellites and their technical characteristics. 3. The student should be able to utilize remote sensing data from space and air in the study of natural, environmental and agricultural phenomena. 4. The student should be able to analyze and process satellite images using specialized software to extract spatial information. 5. The student should be able to apply remote sensing techniques in the fields of monitoring environmental changes, managing natural resources, and monitoring vegetation cover.
105. Teaching and learning strategies	

strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
106. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method



the first	2 Theory 3 practical	/ A1, B2 Clarifying the basic concepts of forestry science and its applications in various fields	:theoretical History of remote sensitivity :practical The ERDAS program interface.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B2 / The student should be able to explain the basic concepts of forestry science and its applications in various fields for environmental purposes	theoretical: The remote sensing model and its physical basis practical: Review of satellite images	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B2 / The student should be able to know Advantages of the information collected by remote sensing devices and their most important applications	:theoretical Advantages of the information collected by remote sensing devices and their most important applications :practical Cut off the study area	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	A1/ The student should be able to explain the concept of color theory	:theoretical Color theory :practical Applications in cutting the study area	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	B1 / The student should be able to know Methods of data interpretation numerical) interpretation and visual (interpretation	:theoretical Methods of data interpretation numerical) interpretation and (visual interpretation :practical Geographical correction	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B2 / The student should be able to identify the spectral reflectivity properties of plants	:theoretical Spectral reflectivity properties of plants :practical radiometric , and , spatial sensing	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1, B2 / The student must be able to understand and comprehend Spectral reflectivity properties of soils	:theoretical Spectral reflectivity properties of soils :practical radiometric , and , spatial sensing (applications)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ The student must be able to Explaining the concept of spectral reflectivity properties of water (clean and polluted) and snow	:theoretical Spectral reflectivity properties of water (clean and polluted) and snow :practical Bands collect area and distance measurements using .software	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1/ The student should be able to explain the concept satellites And how it works	:theoretical satellites :practical , Collecting bands measuring areas and distances using software .(applications)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, B2 / The student should be able to distinguish between ,American French, and Indian satellites	:theoretical American, French and Indian satellites :practical Non-directed classification	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B2 / The student must be able to Understanding the advantages of information gathered from satellite-borne sensors and radar	:theoretical Advantages of the information gathered from satellite-borne sensors and radar :practical Targeted classification	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ The student must be able to Understanding the methods used to improve spatial data and comparing them in terms of work quality	:theoretical Methods for improving space data :practical Guided classification (applications)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1, B2 / The student must be able to knowledge Methods of classifying space data	:theoretical Methods of classifying space data :practical Map production	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B2 / The student must be able to knowledge Key applications used in remote sensing in forests	:theoretical Remote sensing applications in forests :practical Map production (application)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	exam	exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

107. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
108. Learning and teaching resources	
Required textbooks curriculum books, if (available)	.Remote Sensing and Visual Interpretation by Dr Hikmat Subhi Al-Daghistani
Main references (sources)	Remote sensing interpretation
Recommended books and references (scientific (...journals and reports	Remote Sensing Fundamentals Book Applications, Dr. Nabil Sobhi Al-Daghistani
Electronic references and websites	http://www.ersi.ca/ Earth Resource Surveys Inc.



Course description template

109. :Course name	
Water Management	
110. Course code:	
DES203	
111. semester / year	
112. Date of preparation of description	
2024/9/1	
113. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
114. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
115. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
116. Course objectives	
Goals	1. be able to understand the basic principles of should water resource management and its types. 2. The student should be able to analyze surface and groundwater sources and evaluate their efficiency. 3. The student should be able to design and implement strategies for the optimal use of water in agricultural and industrial activities. 4. The student should be able to assess the impact of human activities on water resources and water quality.
117. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
118. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method



the first	2 Theory 3 practical	A2/ The student should be able to define the concept of water management and its importance in the sustainability of water resources and agriculture.	:theoretical Introduction to Water Management . practical: Average rainfall at the stations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B1 / The student should be able to distinguish between different sources of water ,surface) ,groundwater treated (wastewater.	:theoretical hydrological cycle :practical tension and extension analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A2, B1 / The student should be able to explain the characteristics of water resources and the factors that make them available spatially and temporally.	:theoretical Hydrological measurements :practical Morphological analysis of basins	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

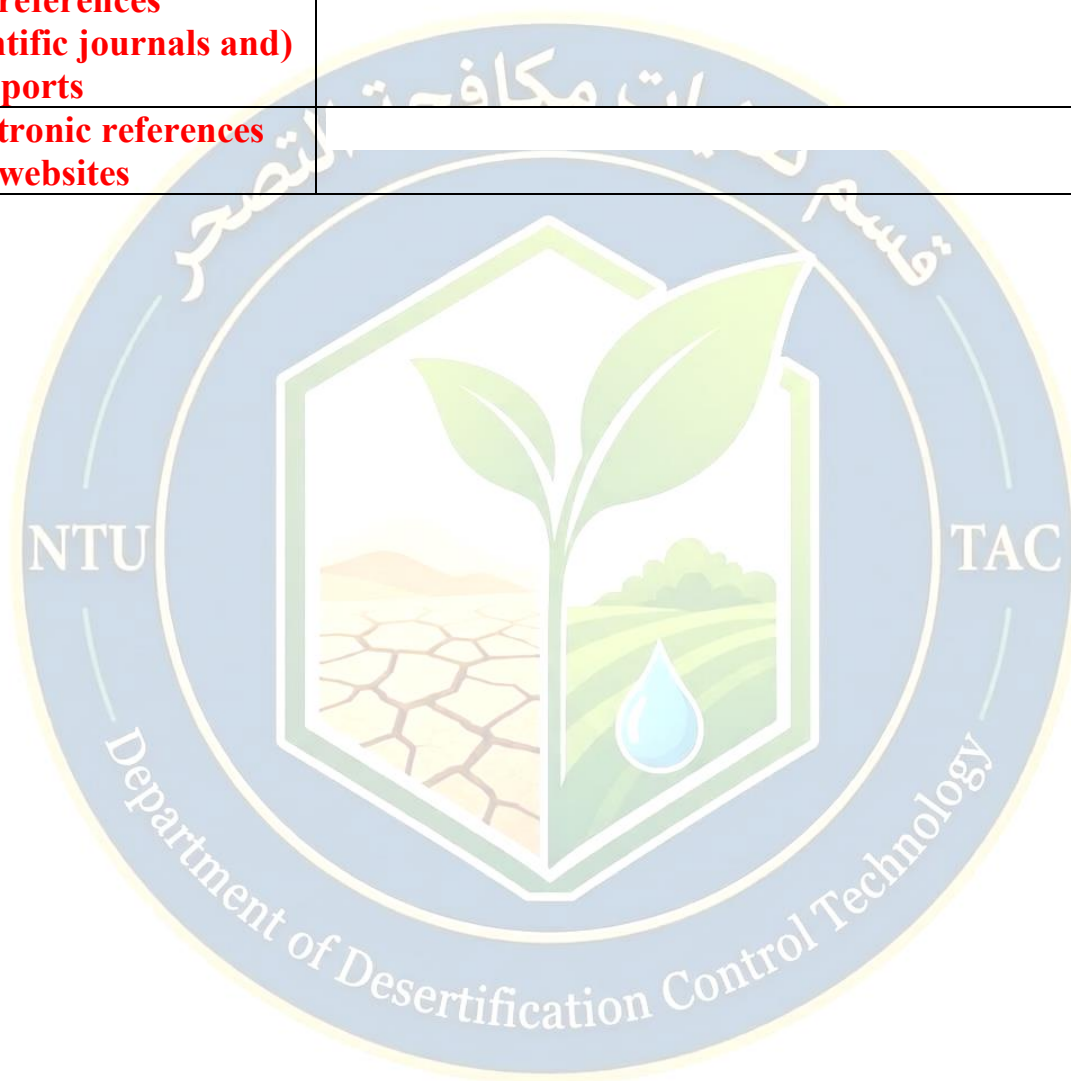
Fourth	2 Theory 3 practical	B1 / The student should be able to analyze the natural and human factors affecting water consumption.	:theoretical Rainfall :practical Measuring discharge in rivers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A2, B1 / The student should be able to evaluate the efficiency of water use in agricultural systems.	:theoretical absorption and storage :practical Hydrogram separation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A2/ The student should be able to compare different irrigation ,methods (surface sprinkler, drip) in terms of efficiency and suitability.	:theoretical Evaporation and transpiration :practical Flood frequency analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	B1 / The student should be able to evaluate rainwater and floodwater harvesting strategies.	:theoretical floods :practical Hydrological facility	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A2, B1 / The student should be able to explain the relationship ,between soil water and plants and its impact on water management.	:theoretical Water flow :practical Flood control	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A2, B1 / The student should be able to analyze the problems of ,water salinity quality and its impact on agriculture.	Theory: Surface Water Hydrology (Hydrography) Practical: Measuring flow in groundwater layers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A2/B The student should be able to identify methods for treating wastewater for reuse.	Theoretical: Statistical methods in hydrology Practical: Average rainfall in the oceans	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	B1 / The student should be able to design an irrigation system suitable for a particular crop or region.	Theory: Water underground My work: Leakage in the hydraulic structure	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A2, B1 / The student should be able to analyze water challenges in light of climate change.	:Theoretical Groundwater level :Practical work Characteristics of groundwater layers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A2/ The student should be able to propose sustainable solutions for managing water demand in different sectors.	:theoreticalDarcy low Practical: Tension and Extension Analysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	B1 / The student must be able to prepare an integrated plan for managing water resources in a specific agricultural or urban area.	Theory: Well Characteristics :Practical work Morphological analysis of basins	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A2, B1 / The student should be able to discuss the role of reservoirs and dams in water management.	My theory: River water :Practical work Measuring discharge in river water	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
119. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					

120. Learning and teaching resources	
Required textbooks curriculum books, if) (available	Lectures prepared by the course instructor
Main references (sources)	
Recommended books and references scientific journals and) (...reports	Modern water management approach
Electronic references and websites	



Course description template

121. :Course name	
Fertility and fertilization	
122. Course code:	
DES204	
123. semester / year	
124. Date of preparation of description	
2024/9/1	
125. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
126. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
127. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Ziad Amer Mustafa :e-mail mti.Iec96.Zeyad@ntu.edu.iq	
128. Course objectives	
Goals	1. The student should be able to understand the basics of soil fertility and the factors that affect agricultural production. 2. The student should be able to identify the different components of the soil and measure its chemical, physical and biological fertility. 3. The student should be able to assess the needs of plants for primary and secondary nutrients. 4. The student should be able to design organic and chemical .fertilization programs according to soil type and crops
129. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

130. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	A1, B2 / The student should be able to define the concept of soil fertility and its relationship to agricultural growth and productivity.	:theoretical - The world and food - Soil fertility Fertilizers and their role in increasing production and meeting the growing need for food :practical Calculating the amount of fertilizer added to carry out a fertility experiment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ The student should be able to distinguish between the major and minor nutrients necessary for plant growth.	:theoretical Nutrients and their importance to plants ,primary elements ,secondary elements availability of nutrients, types of availability, factors affecting them. :practical Principles and rules of fertility survey	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B2 / The student should be able to explain the role of ,nitrogen phosphorus and potassium in plants and soil.	:theoretical Symptoms of malnutrition, primary and secondary :practical Fertility calendar	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	B2 / The student should be able to analyze the movement of nutrients in the soil and their effect on their availability to the plant.	:theoretical Principles of fertilization, types of fertilizers, their quantity, when to add them, and methods of adding them :practical Fertility calendar	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to assess the factors affecting soil fertility such as pH , salinity , and the amount of organic matter.	:theoretical Inorganic fertilizers and the obstacles to their use, according to their type and .application :practical Principles and rules of fertility survey	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B2 / The student should be able to compare different types of fertilizers ,chemical) ,organic (biological.	:theoretical and potassium ,fertilizers (simple compound and complete), their types .and properties :practical Descriptive tests of fertilizers Nitrogen	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	B2 / The student must be able to conduct soil analysis tests to estimate its nutrient content.	:theoretical Mixed fertilizers, their importance, and the disadvantages of mixing different types .of fertilizers :practical Nitrogen readiness guide	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ The student should be able to explain the methods of adding fertilizers mixing with the) soil, foliar ,fertilization through (irrigation.	:theoretical Manufacturing various fertilizers in .Iraq and the world :practical Descriptive tests of phosphate fertilizers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	B2 / The student should be able to design an integrated fertilization program for different agricultural crops.	:theoretical Methods of adding fertilizers and related calculations :practical Phosphorus readiness guide	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, B2 / The student should be able to identify the fertilizer needs of crops at different stages of their growth.	:theoretical Various organic fertilizers, liquid ,fertilizers, their types advantages and .disadvantages :practical Descriptive tests of fertilizers Potassium	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to discuss the impact of excessive fertilization on the environment and pollution.	:theoretical The residual effect of :fertilizers in the soil ,nitrogen, phosphate potassium and organic .matter :practical Potassium readiness guide	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B2 / The student should be able to analyze the relationship between soil fertility and agricultural practices (crop rotation, organic (mulch.	:theoretical Hydroponics, the quantitative relationships between the plant and its .constituent nutrients :practical Micro-elements readiness guide	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	B2 / The student should be able to evaluate the role of bio-fertilizers in improving soil fertility and agricultural sustainability.	:theoretical Food requirements .fertilization research :practical Plant analysis and fertility assessment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B2 / The student should be able to analyze the relationship between soil fertility and agricultural practices (crop rotation, organic mulch.	:theoretical Introducing soil fertility, studying soil .fertility problems :practical exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B2 / The student should be able to prepare an integrated plan for soil fertility and fertilization in a specific production system.	:theoretical Iraqi soil fertility, the reality of Iraqi soil fertilization, and future prospects :practical Discussion of experimental reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

131. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
132. Learning and teaching resources	
Required textbooks curriculum) books, if (available	Course lectures prepared by the course instructor
Main references (sources)	, Awad Kazem Mashhout (1987) Fertilization and Soil Fertility Ministry of Higher Education and Scientific Research, University .of Basra ,Al-Nuaimi, Saadallah (1999) Fertilizers and Soil Fertility Ministry of Higher Education and Scientific Research, University of Mosul
Recommend d books and references scientific) journals and (...reports	Awad, Kadhim Mashhout , 1984. Scientific tests of fertilizers .and soil fertility. University of Basra
Electronic references and websites	Soil Science Society of America Library Genesis

Course description template

133. :Course name	
Geomorphology	
134. Course code:	
DES205	
135. semester / year	
First semester	
136. Date of preparation of description	
2024/9/1	
137. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
138. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
139. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
140. Course objectives	
Goals	1. The student should be able to understand the basic principles of geomorphology and the evolution of landforms. 2. The student should be able to identify the natural processes that shape the Earth's surface, such as erosion, sedimentation, and volcanoes. 3. The student should be able to analyze and interpret topographic maps and satellite images related to geomorphology. 4. The student should be able to study the ,topographical patterns of plains, mountains valleys, and water bodies.
141. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

			6. .Assigning teamwork to reveal leadership skills		
142. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method



the first	2 Theory 3 practical	A3/ The student should be able to define geomorphology and explain its applied importance.	Theoretically: Introduction to – Geomorphology ,Definition, Origin Importance, Branches. practical: Understanding topographic maps and their symbols.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B2 / The student should be able to explain the evolution of the Earth's surface over geological time.	Theoretically: The origin and evolution of the Earth's surface throughout geological eras. practical: An exercise in identifying surface features using maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	B2 / The student should be able to explain the role of internal processes in shaping terrain.	Theoretically: Internal processes structural) ,movements ,earthquakes (volcanoes. practical: Analysis of maps showing areas of volcanic and seismic activity.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

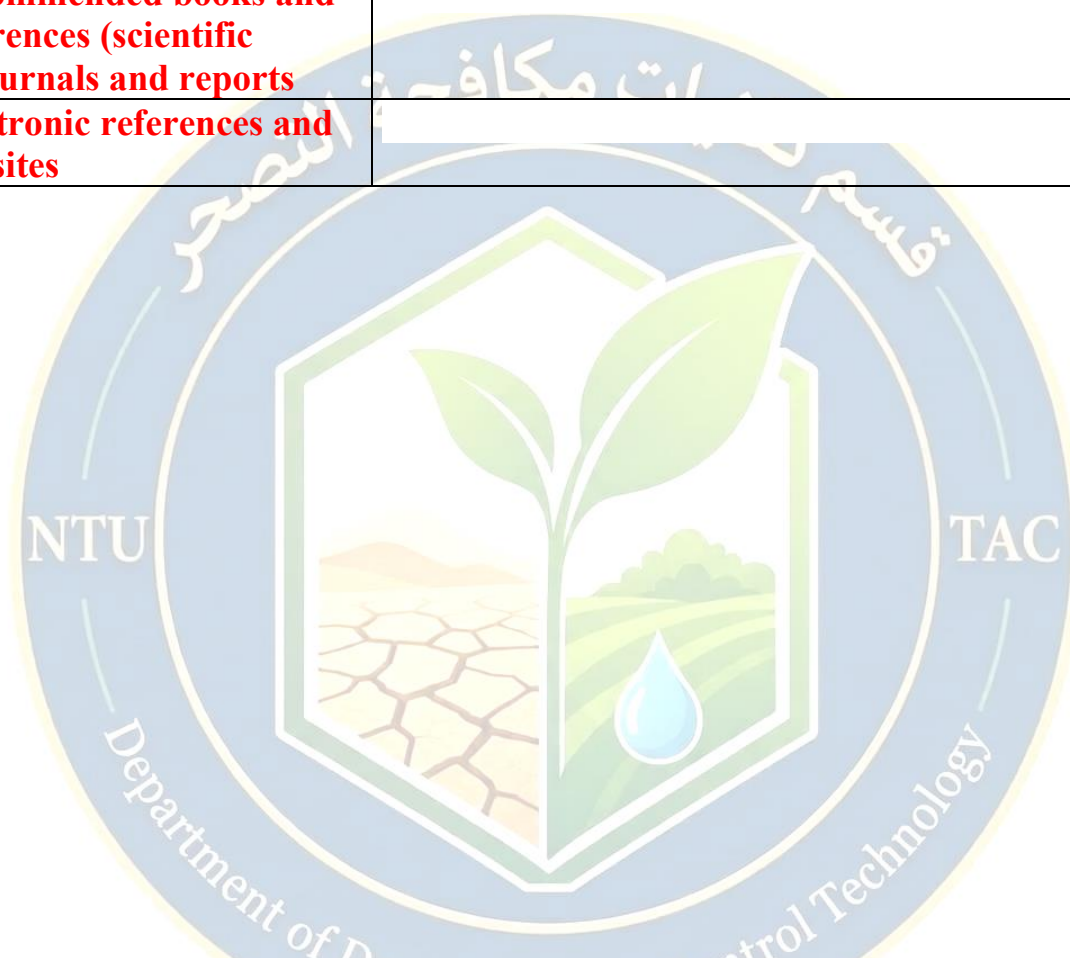
Fourth	2 Theory 3 practical	A3/ The student should be able to distinguish between the types of weathering and their effects.	: My theory External processes weathering and) (erosion. practical: Study of rock samples affected by weathering.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	B2 / The student should be able to describe the manifestations of erosion caused by running water.	Theoretically: Water erosion: its forms and consequences. practical: Drawing sections of valleys and rivers.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	/A3 The student should be able to analyze the phenomena of ,erosion, transport .and deposition Al-Rihi.	Theoretically: Wind erosion and its forms. : practical Identifying satellite images of sand dune areas.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	B2 / The student should be able to explain the role of ice in shaping the Earth's surface.	: My theory Glacial erosion. practical: Analysis of images showing the shapes resulting from glaciers.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A3, B2 / The student should be able to interpret the shapes resulting from the action of waves and ocean currents.	My theory: Marine erosion and coastline shapes. practical: Studying maps and images of sea coasts.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A3, B2 / The student should be able to classify landforms according to different geomorphological processes.	My theory: For the forms resulting from the combined processes (rivers - winds - sea). practical: A practical exercise on classifying landforms.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	B2 / The student should be able to explain the characteristics of landforms in arid environments.	My theory: features in arid regions. practical: Analysis of maps and satellite images of the desert.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A3/ The student should be able to compare landforms in different environments.	: My theory Surface features in humid areas. : practical Studying the topography of wetland areas using maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A3, B2 / The student should be able to interpret surface features through topographic maps .	My theory: Geomorphology and topographic maps. practical: Training on reading and analyzing topographic maps.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	B2 / The student should be able to link geomorphology to environmental and agricultural problems.	My theory: Applications of geomorphology in agriculture and the environment. practical: Case studies of applied problems of erosion and desertification.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A3, B2 / The student should be able to employ geomorphology in the fields of urban and engineering planning.	: My theory Applications of geomorphology in planning and engineering. practical: Discussion of examples of engineering projects related to geomorphology.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A3, B2 / The student should be able to integrate his knowledge and analyze geomorphological problems in an applied manner.	+ Theoretical Practical: – General review Discussion of project reports – Final exam.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
143. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
144. Learning and teaching resources	
Required textbooks curriculum books, if) (available	
Main references (sources)	
Recommended books and references (scientific (...journals and reports	
Electronic references and websites	



Course description template

145. :Course name
Fruit production in desert areas
146. Course code:
DES206

147. semester / year					
First semester					
148. Date of preparation of description					
2024/9/1					
149. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
150. Number of credit hours (total) / Number of units (total)					
hours (2 theory + 3 practical)* 15 weeks 75					
151. Name of the course coordinator (list all names, if there is more than one)					
the name: Dr. Fares Faisal Abdul Ghani :e-mail faris.faisal.701@ntu.edu.iq					
152. Course objectives					
Goals		The student should be able to identify the suitable .1 .environment for fruit production in desert regions The student should be able to identify methods of growing .2 .fruit trees in desert areas The student should be able to identify the types of fruit that .3 .can be produced in desert regions The student should be able to learn about fruit cultivation in .4 .desert regions			
153. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
154. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method

the first	2 Theory 3 practical	A1, B2 / The student should be able to explain the importance of fruit production in desert environments.	:theoretical Introduction to fruit production in desert regions – importance and challenges. :practical Discussion of local examples of fruit orchards in arid environments.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ The student should be able to describe the characteristics of the soil and desert climate and their effect on fruit growth.	:theoretical Climatic and soil characteristics in desert regions. :practical Soil samples were taken from different areas and examined.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ The student should be able to distinguish which varieties are most suitable for cultivation in arid regions.	:theoretical Selecting species and varieties suitable for desert conditions. :practical Identifying plant specimens and images of drought-resistant varieties.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	A1, B2 / The student should be able to design a preliminary plan for the establishment of a desert fruit orchard.	:theoretical Establishing fruit orchards in desert ,areas (planning (leveling, excavation. :practical An exercise in drawing a plan for creating a desert orchard.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1/ The student must be able to apply modern irrigation methods suitable for desert conditions.	:theoretical Modern irrigation systems (drip irrigation - sprinkler (irrigation. :practical Operating a drip irrigation system and testing water distribution.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	B2 / The student should be able to accurately estimate the water needs of fruit trees.	:theoretical Irrigation water management under conditions of water scarcity. :practical Calculating the irrigation needs for a specific fruit crop.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	B2 / The student must be able to prepare a fertilization program suitable for desert conditions.	:theoretical Fertilizers and their role in fruit production in desert environments. :practical Preparing fertilizer solutions for application by irrigation (fertigation).	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ The student should be able to diagnose salinity problems and suggest appropriate solutions.	:theoretical The effect of salinity on fruit production. :practical Testing the salinity of soil and irrigation water and analyzing the results.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	B2 / The student must be able to carry out horticultural service operations practically.	:theoretical Agricultural ,operations (pruning thinning, horticultural (service. :practical A practical application of pruning in fruit trees.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1, B2 / The student should be able to diagnose pests and diseases and develop integrated pest management plans.	:theoretical Resistance to pests and diseases in desert environments. :practical Examining infected plant samples and determining the type of infection.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to explain the role of biotechnology in supporting desert fruit production.	:theoretical Biotechnology and the production of stress-resistant seedlings. :practical Visit to the tissue culture laboratory/miniature vegetative propagation experiment.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B2 / The student should be able to identify the most important desert fruit crops and their characteristics.	:theoretical Main fruit crops in ,desert regions (dates (pomegranates, olives :practical Studying a sample of the fruits or leaves of these crops.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	B2 / The student should be able to apply post-harvest techniques to reduce losses.	:theoretical Post-harvest management of fruit crops in hot environments. :practical A simple experiment in preserving and storing some fruits.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	B2 / The student should be able to propose strategies for the sustainable production of fruit in deserts.	:theoretical Sustainability in fruit production in deserts - renewable energy) (water reuse. :practical Discussion of case studies of farms that rely on solar energy or treated water.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B2 / The student should be able to integrate his theoretical and practical knowledge to solve problems of fruit production in deserts.	Final exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

155. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
156. Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

157. :Course name	
Tractors and agricultural machinery	
158. Course code:	
DES251	
159. semester / year	
160. Date of preparation of description	
2024/9/1	
161. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
162. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
163. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub :e-mail Samir.f.ayoub@ntu.edu.iq	
164. Course objectives	
Goals	1- The student should be able to identify the different types .of agricultural tractors 2- The student should be able to identify the parts of . agricultural equipment and how each one works 3- The student should be able to know how to perform . routine maintenance on agricultural equipment 4- The student should be able to identify the type of tractor needed for each agricultural operation and its relationship to . the type of soil
165. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

166. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	A2/ The student should be able to define the concept of agricultural mechanization and the importance of using tractors and agricultural machinery.	Theory/ The Importance of Agricultural Mechanization in Agricultural Production. Types of Agricultural Mechanization locomotive: definition and types. Practical/ General .Safety Driving Rules Learn to drive a farm tractor.	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /Practical Assignment of tasks and reports	Tests and reports
the second	2 Theory 3 practical	B1 / The student should be able to distinguish between the types of agricultural plows, their parts and their uses.	Theory/ Main parts of a locomotive (engine and its fixed and (moving parts. Means of transport and mechanical energy. Practical/ Identifying the main parts of the tractor (engine and .(parts	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
the third	2 Theory 3 practical	A2, B1 / The student should be able to explain the operating principles of internal combustion engines used in agricultural tractors.	Theory/ Fuel system for diesel and gasoline engines, system .components Practical/ Identifying the components of the fuel system and diesel .and gasoline engines	Theoretical Auditory / :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Fourth	2 Theory 3 practical	A2/ The student should be able to describe the steering, braking and hydraulic lifting systems in tractors.	Theory/ Air and exhaust purification system, system components and the function of each component Practical/ Air and exhaust system - its parts - maintenance	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Fifth	2 Theory 3 practical	A2, B1 / The student should be able to explain the operating principles of internal combustion engines used in agricultural tractors.	Theory/ Tractor cooling and ,lubrication system system components My work/ Cooling - system components its operation - its parts .maintenance -	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Sixth	2 Theory 3 practical	B1 / The student must be able to analyze transmission systems in agricultural tractors.	Theory/ General idea about the relationship of the machine to agricultural lands, and how to connect it to the tractor. Practical/ Lubrication - System Components - Operation .Maintenance	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Seventh	2 Theory 3 practical	A2/ The student should be able to describe the steering, braking and hydraulic lifting systems in tractors.	Theory/ Soil preparation plow, cast ,in plow , disc plow- its parts and the function of each part. Practical/ Identifying transmission devices ,(separator, gearbox) their parts, and the .function of each part	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Eighth	2 Theory 3 practical	B1 / The student should be able to explain the mechanism of operation of power torpedo (PTO) connections and their agricultural uses.	Theory/ The digger ,plow, the rotary plow the sub-plow, its parts and the function of each part. My work/ Means of transport and ,mechanical energy and identifying the devices used to exploit the power of .agricultural tractors	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Ninth	2 Theory 3 practical	A2, B1 / The student should be able to explain the working mechanism of soil preparation equipment (disc ,plows, harrows (subsoil plows.	Theory/ Leveling equipment (disc combs, toothed ,combs), their types the importance of each part and leveling and adjustment machines and equipment, their types and the function of each part. My job: Daily and seasonal maintenance of agricultural tractors	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
tenth	2 Theory 3 practical	A2/ The student should be able to analyze the operation of agricultural machinery and seeds(Seeders & Planters).	Theory/ Sowing equipment, grain seeds, their parts, and the function of each ,part. Fertilized seeds their parts, and the function of each part. My work: Pest control ,and tillage equipment its types, parts, and the function of each ,part	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

eleven th	2 Theory 3 practical	B1 / The student should be able to explain the operation of post-planting service ,machines (hoeing ,spraying fertilizing (machines.	Theory / Types of coarse and concentrated materials and their importance in animal nutrition Practical/ Learn how to connect plows to .the tractor	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
twelfth	2 Theory 3 practical	A2, B1 / The student should be able to evaluate the efficiency of harvestersand compare them in terms of performance.	Theory / How to organize and calibrate seeds, calculation problems, and sowing methods. Practical/ Identifying disc combs, their types, parts, and the .function of each part	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
thirteen th	2 Theory 3 practical	A2/ The student should be able to discuss the role of agricultural mechanization in increasing productivity and reducing costs.	Theory/ Irrigation equipment (water channel switches), its parts and the function of each part. Practical/ Toothed ,combs, their types parts, and the function .of each part	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
fourteen th	2 Theory 3 practical	B1 / The student should be able to distinguish between the types of tractors (Crawler, Wheel) and their main parts and functions.	Theory/ Maintenance of tillage, leveling and seeding equipment. Practical/ Identifying leveling and adjustment machines and equipment, their types, and the .function of each part	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

fifteen th	2 Theory 3 practical	A2, B1 / The student should be able to prepare a comprehensive report on the use of tractors and agricultural machinery in a specific production system.	Theory/ Preparatory week before the final exam Practical/ Exam	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
167. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
168. Learning and teaching resources					
Required textbooks curriculum) books, (available	if	Lectures prepared by the course instructor			
Main references (sources)		Agricultural machinery and equipment Yassin Al-Tahhan - Muhammad Al-Na'ma			
Recommended books and references scientific) journals and (...reports		Fundamentals of Agricultural Technology / Agricultural Tractors 2018			
Electronic references and websites		file:///C:/Users/pc/Downloads/%D8%A7%D9%84%D8%AC%D8%B1%D8%A7%D8%B1%D8%A7%D8%AA%20%D8%A7%D9%84%D8%B2%D8%B1%D8%A7%D8%B9%D9%8A%D8%A9%20%D9%88%D8%AA%D8%B1%D9%83%D9%8A%D8%A8%D9%87%D8%A7%20%D8%A7%D9%84%D8%B9%D8%A7%D9%85.pdf			

Course description template

169. :Course name					
Agricultural pests					
170. Course code:					
DES252					
171. semester / year					
172. Date of preparation of description					
2024/9/1					
173. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
174. Number of credit hours (total) / Number of units (total)					
hours (2 theory + 3 practical)* 15 weeks 75					
175. Name of the course coordinator (list all names, if there is more than one)					
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq					
176. Course objectives					
Goals		1. The student was able to understand and grasp the . economic importance of insects and diseases 2. Enabling the student to know how to diagnose agricultural . pests and how to combat them			
177. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
178. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method

the first	2 Theory 3 practical	A2, B1 / The student should be able to understand the economic importance of insects and methods of controlling them ,natural, physical) ,mechanical ,biological legislative and .(chemical	Theory/ The economic importance of insects and methods of controlling them ,natural, physical) ,mechanical biological, legislative (and chemical Practical work/ Insect ,classification characteristics, and :major insect orders Straight-winged insects (grasshoppers and carobs), Equal-winged insects (grasshoppers), Equal-winged insects (aphids), Hemiptera) (cukes), Ciliates thrips), Crustaceans (beetles), Winged ,insects (butterflies ,moths), Diptera (flies ,(mosquitoes ,Hymenoptera (bees (wasps	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /Practical Assignment of tasks and reports	Tests and reports
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the second	2 Theory 3 practical	A2, B1 / The student must be able to Understanding the incubation of common pests ,grasshoppers) ,carob, aphids ,whiteflies ,earthworms earthworms, red (spider mites	Theory/ Common ,pests (grasshoppers ,carob, aphids ,whiteflies ,earthworms earthworms, red (spider mites Practical/ Pictures of chemical pesticide preparations (dry preparations, liquid preparations, gaseous preparations), control tools (spraying tools ,(and fumigation tools how to use and maintain them, the spraying process, its definition, types of .spraying	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
the third	2 Theory 3 practical	A2, B1 / The student must be able to To explain the pests of wheat, barley and corn (bread, seed ,worm, ear bug aphid, corn stalk (bug	Theory/ Pests of wheat, barley and corn (bread, seed ,worm, earwig, aphid (corn stalk bug My work/ Cotton and bean pests (scientific - name - description damage - methods of prevention and .(treatment	Theoretical Auditory / :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Fourth	2 Theory 3 practical	A2, B1 / The student must be able to To identify cotton and bean pests ,cotton leafworm) spiny and pink cottonworm, red spider mite, black (bean bug	Theory/ Pests of Cotton and Beans ,Cotton Leafworm) Spiny and Rosette Cottonworm, Red Spider Mite, Black (Bean Bug Practical/ Botanical Description of Clover Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Fifth	2 Theory 3 practical	A2, B1 / The student must be able to To identify pests of the Cucurbitaceae family (scientific - name - description damage - methods of prevention and .(treatment	Theoretically, pests of the Cucurbitaceae ,family (flake beetle ,cucumber beetle (melon fly My work/ Pests of the Cucurbitaceae family - scientific name) - description - damage methods of prevention .(and treatment	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Sixth	2 Theory 3 practical	A2, B1 / The student should be able to explain the pests of the Solanaceae family (potato ,tuber moth tomato fruit (worm	Theory/ Pests of the Solanaceae family ,potato tuber moth) (tomato fruit worm Practical/ Botanical Description of Broad Bean Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Seventh	2 Theory 3 practical	A2, B1 / The student should be able to understand and comprehend ,the pests of figs pomegranates and grapes (fig fly, fig ,leafworm pomegranate worm, grape leafworm, grape (cluster worm	,Theory/ Pests of figs pomegranates and grapes (fig fly, fig ,leafworm ,pomegranate worm grape leafworm, grape (cluster worm My work/ Pests of figs, pomegranates and grapes (scientific - name - description damage - methods of prevention and .(treatment	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Eighth	2 Theory 3 practical	A2, B1 / The student must be able to Knowledge of pests of the Solanaceae family (scientific - name - description damage - methods of prevention and .(treatment	Theoretical/ Fodder Beet Crop My work/ Pests of the Solanaceae family - scientific name) - description - damage methods of prevention .(and treatment	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Ninth	2 Theory 3 practical	A2, B1 / The student should be able to explain the pests of olives and palm trees olive scale, olive) insect, palm weevil , palm (canker, dust mite	Theory/ Pests of olives and palms olive scale, olive) , insect, palm dubas palm canker, dust (mite My work/ Pests of olives and palm trees - scientific name) description - damages methods of - prevention and .(treatment	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
tenth	2 Theory 3 practical	A2, B1 / The student should be able to identify stem borers, their types and how to ...control them agricultural rodents... birds harmful to agricultural production.	Theoretical/ Botanical Description of Sorghum Practical/ Botanical Description of the Yellow Corn Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

eleven th	2 Theory 3 practical	A2, B1 / The student must be able to To become familiar with some definitions and terminology in ,plant pathology plant diseases of economic ...importance classification of plant diseases	Theory / Some definitions and terms ,in plant pathology plant diseases of economic ...importance Classification of plant diseases My work/ Stem borers, their types and ...how to control them ...Agricultural rodents Birds harmful to agricultural production.	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
twelfth	2 Theory 3 practical	A2, B1 / The student must be able to To recognize the most important fungal diseases (rust and scald on) ,wheat and barley powdery mildew on grapes, downy mildew on , cucurbits ,seedling death , Fusarium wilt food poisoning in cotton, and palm .(pollen blindness	Theoretical/ The most important fungal diseases (rust and scald on wheat and barley, powdery ,mildew on grapes downy mildew on cucurbits , seedling , death, Fusarium wilt food poisoning in cotton, and palm (pollen blindness Practical/ Leg borers - Description) (Damage	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

thirteenth	2 Theory 3 practical	A2, B1 / The student should be able to understand and comprehend the most important bacterial diseases (soft rot on vegetables, angular spots on cotton, bacterial burn on apples and pomegranates, and olive branch knot.	Theory/ The most important bacterial diseases (soft rot on vegetables, angular spots on cotton, bacterial burn on apples and pomegranates, and olive branch knot. /My work Agricultural rodents (structural) characteristics, habits and temperament, the most important rodents of economic and agricultural importance, their (control	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignments and reports	Tests and , reports assignments
fourteenth	2 Theory 3 practical	A2, B1 / The student should be able to explain the most important viral diseases (tomato mosaic, tomato leaf curl and yellowing, lines (on barley	Theory/ The most important viral diseases (tomato mosaic, tomato leaf curl and yellowing (barley streaks My work/ Birds that are harmful to agricultural production (harmful species, agricultural (damage	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignments and reports	Tests and , reports assignments

fifteen th	2 Theory 3 practical	A2, B1 / The student should be able to identify insects of economic importance and methods of controlling them ,natural, physical) ,mechanical ,biological ,legislative ,(chemical	Theory/ Insects of economic importance and methods of controlling them ,natural, physical) ,mechanical ,biological, legislative (chemical My work/ The most important bacterial - diseases (cause symptoms and signs (of infection - control The most important - viral diseases (cause symptoms and signs (of infection - control	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
179. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
180. Learning and teaching resources					
Required textbooks curriculum) books, (available	if	Lectures prepared by the course instructor			
Main references (sources)					
Recommended books and references scientific) journals and (...reports					
Electronic references and websites					

Course description template

181. :Course name
Nurseries and propagation
182. Course code:
DES253
183. semester / year
184. Date of preparation of description
2024/9/1
185. Available forms of attendance
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities
186. Number of credit hours (total) / Number of units (total)
hours (2 theory + 3 practical)* 15 weeks 75
187. Name of the course coordinator (list all names, if there is more than one)
the name: M.M. Ziad Amer Mustafa :e-mail mti.Iec96.Zeyad@ntu.edu.iq
188. Course objectives

Goals		1. ,The student should be able to define a nursery, its types economically important nurseries, nursery planning, and .nursery facilities 2. The student should be able to identify methods of propagation (sexual propagation - seed stratification, root ,production, the mutual effects between grafts and roots stratification - types of stratification and vegetative .(propagation: by cuttings - hormone treatment			
189. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
190. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method

the first	2 Theory 3 practical	A1/ The student should be able to explain the concept of a nursery, its types its economic importance, and how to choose the appropriate land for its establishment.	Theory/ Definition of a nursery - Types of nurseries - Economic importance of nurseries. Practical/ Nursery - Site Selection Nursery Site Planning	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /Practical Assignment of tasks and reports	Tests and reports
the second	2 Theory 3 practical	B2 / The student should be able to explain the steps of planning the nursery, identify ,its basic facilities and use agricultural tools.	- theory/ planning Nursery facilities My work/ nursery equipment and tools	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
the third	2 Theory 3 practical	A1, A2/ The student should be able to distinguish methods of sexual ,reproduction examine the germination and ,viability of seeds and plant them.	/theoretical Reproduction by sexual means - seed propagation, root .production Practical work/ Seed germination - Seed viability - Seed cultivation in the .nursery	Theoretical Auditory / :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Fourth	2 Theory 3 practical	A1, B1 / The student should be able to explain the reasons for seed dormancy and apply methods to break dormancy.	theoretical/ Seed dormancy - its types My work/ Firming processes and chemical and mechanical treatments to break the dormancy .phase	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Fifth	2 Theory 3 practical	A1, B1 / The student should be able to explain the methods of propagation by cuttings and the use of hormones with the sterilization of agricultural environments.	Theory/ Vegetative Propagation: By Cuttings - Hormone Treatment Practical/ Sterilization of agricultural environments and soil Types of agricultural - environments.	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Sixth	2 Theory 3 practical	B1 / The student should be able to explain the concept of numbering and apply it practically to increase the number of plants.	theoretical/ Increased numbering - types of numbering. My work/ increasing vegetative plants	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Seventh	2 Theory 3 practical	A1/ The student should be able to explain the methods of grafting, grafting and carrying out the propagation of ornamental plants	/Theory Augmentation through grafting and grafting My work/ propagation of ornamental plants	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Eighth	2 Theory 3 practical	A1/ The student should be able to distinguish between methods of growth by cancers and roots and prepare different cuttings.	theoretical/ Increased number of cancers and roots Practical/ Preparation of the Mind - Woody - Semi-Woody - Recipe	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Ninth	2 Theory 3 practical	A1, B1 / The student should be able to explain the compatibility between grafts and rootstocks and to carry out grafting and grafting practically.	/theoretical Interactions between grafts and roots Practical/ Performing grafting and grafting operations in the nursery	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
tenth	2 Theory 3 practical	A1, A2/ The student should be able to analyze the problem of incompatibility and practically perform different methods of reproduction.	/theoretical Compatibility and incompatibility between taste and origin Practical/ Performing propagation processes ,using cuttings suckers, buds, and roots	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
eleven th	2 Theory 3 practical	A1/ The student should be able to discuss tissue culture technology and apply fertilization methods in the nursery.	Theory / Production of plant tissue culture seedlings Practical/ Carrying out animal and chemical fertilization processes in the nursery	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
twelfth	2 Theory 3 practical	A1, A2/ The student should be able to interpret callus formation and perform various pruning operations.	theoretical/ Callus formation for seedling production My work/ pruning operations in the nursery	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

thirteenth	2 Theory 3 practical	A1, A2/ The student should be able to implement methods of propagation by cuttings, bark and roots and apply fertilization.	/theoretical Propagation by cuttings, bark, and roots Practical/ Carrying out animal and chemical fertilization processes in the nursery	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
fourteenth	2 Theory 3 practical	A1, B1 / The student should be able to analyze the methods of propagation of ornamental plants and use growth regulators to stimulate them.	/theoretical Propagation of .ornamental plants :Practical application Using growth regulators to encourage plant growth	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
fifteenth	2 Theory 3 practical	A1, B1 / The student should be able to summarize his knowledge and apply tissue culture techniques practically.	/theoretical Preparatory week before the final exam Practical/ Practical Reproduction via Tissue Culture	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

191. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

192. Learning and teaching resources

Required textbooks curriculum) books, if (available	Lectures prepared by the course instructor
Main references (sources)	

Recommended books and references scientific journals and (...reports	
Electronic references and websites	



Course description template

193. :Course name	
fodder crops and pastures	
194. Course code:	
DES254	
195. semester / year	
196. Date of preparation of description	
2024/9/1	
197. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
198. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
199. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq	
200. Course objectives	
Goals	1. The student was able to understand and comprehend .what fodder crops are 2. Enabling the student to learn about methods of .cultivating fodder crops 3. To enable the student to become familiar with the most .important sources of animal feed 4. Enabling the student to detect and understand the .palatability of the feed 5. .The student can judge the quality of fodder crops
201. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

202. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method



the first	2 Theory 3 practical	A1, B1 / The student should be able to explain the importance of forage crops and classify them according to plant families.	Theory/ Importance of forage crops, their history , and some definitions related to forage crops Practical/ Forage :Crop Classification The Poaceae Family	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /Practical Assignment of tasks and reports	Tests and reports
the second	2 Theory 3 practical	A1/ The student should be able to describe the alfalfa crop, its importance and botanical characteristics.	Theory/ Alfalfa crop Practical/ Botanical Description of Alfalfa Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
the third	2 Theory 3 practical	A1, B1 / The student should be able to distinguish between perennial and annual alfalfa crops in terms of botanical characteristics.	Theoretical/ annual jet crop Practical/ Botanical Description of the Annual Alfalfa Crop	Theoretical Auditory / :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Fourth	2 Theory 3 practical	B1 / The student should be able to identify the clover crop and its botanical description.	Theory/ Clover Crop Practical/ Botanical Description of Clover Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Fifth	2 Theory 3 practical	A1, B2 / The student should be able to explain the importance of the scallion crop and distinguish its botanical characteristics.	Theoretical/ currant yield Practical/ Botanical Description of the Kurt Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Sixth	2 Theory 3 practical	B2 , C1/ The student should be able to describe the broad bean crop in terms of growth and characteristics.	Theory/ Broad Bean Crop Practical/ Botanical Description of Broad Bean Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Seventh	2 Theory 3 practical	A1, B1 / The student should be able to explain the characteristics of the millet crop and its importance as fodder.	Theory/ Millet Crop Practical/ Botanical Description of Millet Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
Eighth	2 Theory 3 practical	A1, B1 / The student should be able to distinguish fodder beet crop in terms of botanical characteristics and uses.	Theoretical/ Fodder Beet Crop Practical/ Botanical Description of Fodder Beet Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

Ninth	2 Theory 3 practical	A1/ The student should be able to explain the importance of white corn and its botanical description.	Theory/ White Corn Crop Practical/ Botanical Description of Sorghum	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
tenth	2 Theory 3 practical	B2 / The student should be able to describe the yellow corn crop and explain its role as animal feed.	Theory/ Yellow Corn Crop Practical/ Botanical Description of the Yellow Corn Crop	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
eleven th	2 Theory 3 practical	A1, B1 / The student should be able to distinguish between coarse and concentrated materials and apply methods for manufacturing them.	Theory / Types of coarse and concentrated materials and their importance in animal nutrition Practical/ Method of manufacturing roughage and concentrated feed materials	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
twelfth	2 Theory 3 practical	A1/ The student should be able to explain the types of feed mixtures and implement methods of cultivating them.	Theory/ Feed mixtures and their .quality Practical/ Methods of Growing Feed Mixtures	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

thirteenth	2 Theory 3 practical	B1 / The student should be able to explain the importance of the lesson and apply the steps of preparing it.	Theory/ Dress Practical/ How to make a dress	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
fourteenth	2 Theory 3 practical	A1, B1 / The student should be able to explain the role of silage in animal nutrition and apply its methods of operation.	Theory/ Silage Practical/ How to Make Silage	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments
fifteenth	2 Theory 3 practical	A1, B1 / The student should be able to explain the role of pastures in animal production and gain practical field experience.	Theory/ The importance of pastures in livestock production Practical/ Field increase in forage crop fields	/Theoretical Auditory :Methods Writing on ,the Board Direct Dialogue /My work Assignment s and reports	Tests and , reports assignments

203. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

204. Learning and teaching resources

Required textbooks curriculum) books, if (available	Lectures prepared by the course instructor
Main references (sources)	Forage and Pasture Crops - Ali Al-Azzam

Recommended books and references scientific) journals and (...reports	Forage and Pasture Crops by Muhammad Sayyid and Abdullah Qasim Al-Fakhri
Electronic references and websites	ICARDA , the Arab Organization for Agricultural Development

Course description template

205. :Course name	
biochemistry	
206. Course code:	
TAMO302	
207. semester / year	
First semester	
208. Date of preparation of description	
2024/9/1	
209. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
210. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
211. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi	
:e-mail omar.ah.f@ntu.edu.iq	
212. Course objectives	
Goals	The student should be able to understand and .1 comprehend what is related to food components and .their importance The student should be able to know and learn the .2 modern principles and methods in the study of biochemistry and use modern technologies in .scientific study in laboratories
213. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
214. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
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the first	2 Theory 3 practical	:A1/ Theory Explains the concept of cell biology and the general properties of the cell B1 / Practical: He applies safety rules and specifications in laboratories	Theory: The cell and its components My work: Laboratory safety	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	:A1/ Theory Explains the nature of solutions and pH in the body B1 / Practical: It describes carbohydrates and their types	Theory: Water and pH :Practical work Carbohydrates and their types	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	:A1/ Theoretical Understands the nature of carbohydrates and their vital and physiological functions :B1 / Practical General tests for carbohydrates	Theory: Carbohydrates :Practical application Solubility test and Mollich test	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

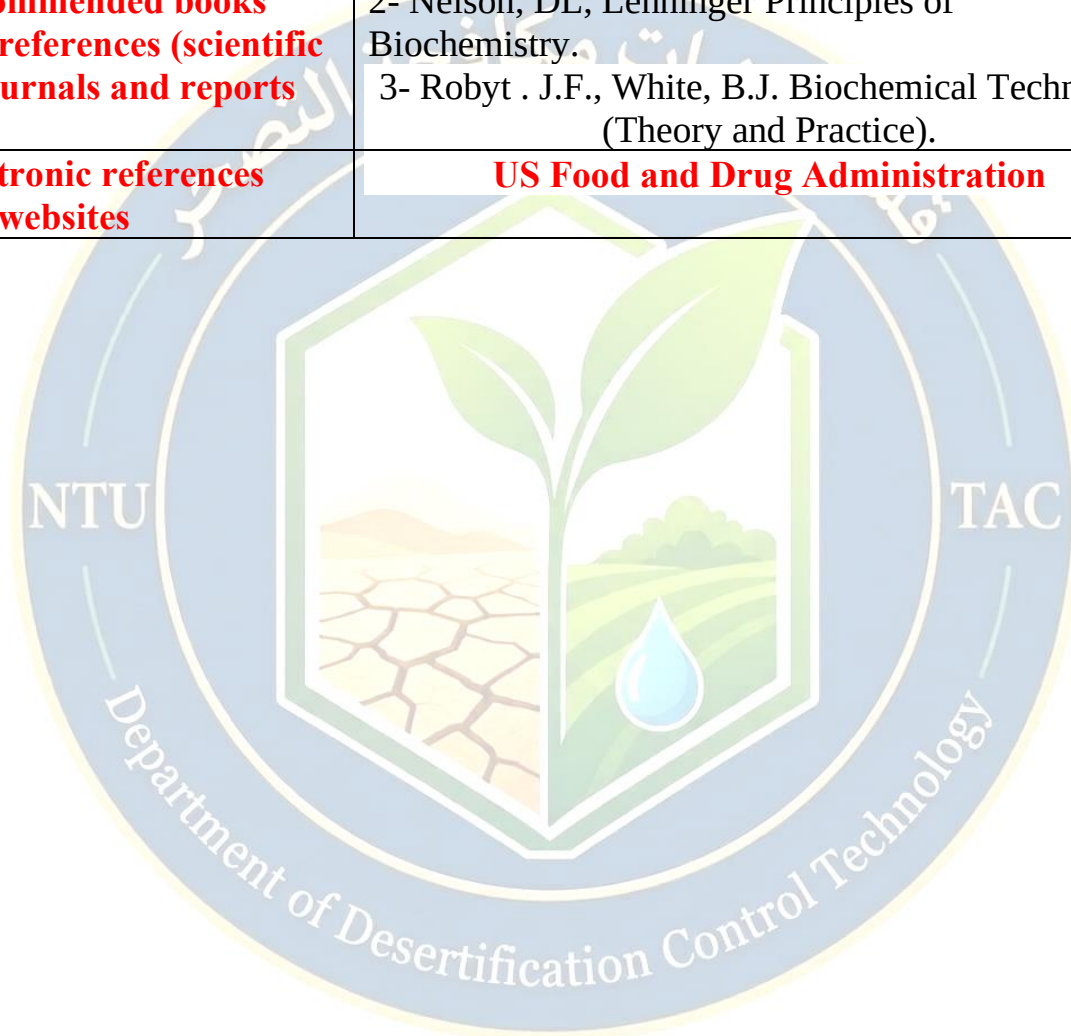
Fourth	2 Theory 3 practical	:A1/ Theory Recognizes derived monosaccharides and .oligosaccharides :B1 / Practical Carbohydrate tests	Theory: Classification of Carbohydrates practical: Reduction tests for carbohydrates	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	:A1/ Theory Explains the ,structure functions, and classification of fats :B1 / Practical Descriptive tests for carbohydrates	Theory: Fats practical: Sucrose hydrolysis, iodine test, and hydrolysis	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	:A1/ Theory Recognizes conjugated complex lipids B1 / Practical: fats	Theory: Complex fats practical: Lipid tests	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Seventh	2 Theory 3 practical	A1/ Theory: It covers the most important derived fats and fatty acids (saturated and unsaturated) :B1 / Practical Tests to detect glycerol	Theory: Derived fats Practical: Test Acrolein for detecting cholesterol	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	:A1/ Theory Recognizes the amino acid properties and the classification of .amino acids :B1 / Practical Buffering solutions	.Theory: Amino acids practical: pH	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	:A1/ Theory Understanding peptides and bonds in proteins :B1 / Practical General and functional amino acids	Theory: Peptides practical: Amino acids	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	:A1/ Theory Understands proteins and their vital and physiological functions :B1 / Practical Detection of amino acids and biosynthetic sulfur	Theory: The biological functions of proteins My work: Amino acids	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ Theory: The student learns about plasma proteins :practical	Theory: Plasma proteins Practical: Mellon test and xanthoprotic test	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	:A1/ Theoretical The student understands enzymes and their .properties :B1 / Practical Functional tests of proteins	theoretical: enzymes My work: proteins	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 3 practical	A1/ Theory: The student explains the vitamins and their classification. :B1 / Practical The student explains the concept of biuret	Theory: Vitamins My work: Biuret	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	:theoretical :B1 / Practical Protein precipitation with heavy metal salts	Theory: Mineral elements My work: proteins	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1/ Theory: The student explains metabolism in the body B1 / Practical: A scientific visit to a biochemistry laboratory	Theory: Metabolism My work: Problem solving	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
215. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					

216. Learning and teaching resources	
Required textbooks curriculum books, if) (available	,Dalali, Basil Kamil1994 Fundamentals of Biochemistry, Dar Al-Kutub for Printing and Publishing, Mosul, Iraq
Main references (sources)	,Dalali, Basil Kamil1994 Fundamentals of Biochemistry, Dar Al-Kutub for Printing and Publishing, Mosul, Iraq
Recommended books and references (scientific (...journals and reports	1- Voet , D. Voet JG. Biochemistry. 2- Nelson, DL, Lehninger Principles of Biochemistry. 3- Robyt . J.F., White, B.J. Biochemical Techniques (Theory and Practice).
Electronic references and websites	US Food and Drug Administration



Course description template

217. :Course name	
Water harvesting	
218. Course code:	
DES303	
219. semester / year	
220. Date of preparation of description	
2024/9/1	
221. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
222. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
223. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
224. Course objectives	
Goals	1. The student should be able to recognize the concept of water harvesting and its importance in water resource management. 2. The student should be able to identify renewable and non-renewable water sources and methods of utilizing them. 3. The student should be able to analyze methods and techniques for harvesting surface and groundwater. 4. The student should be able to design and implement simple water harvesting projects in different environments.
225. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

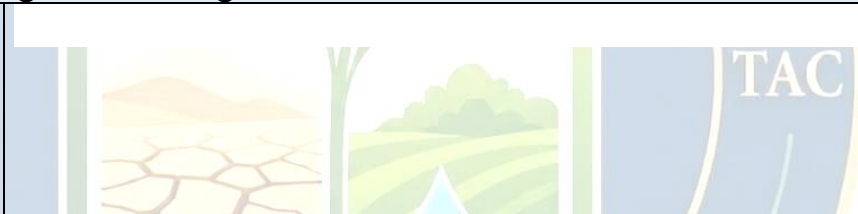
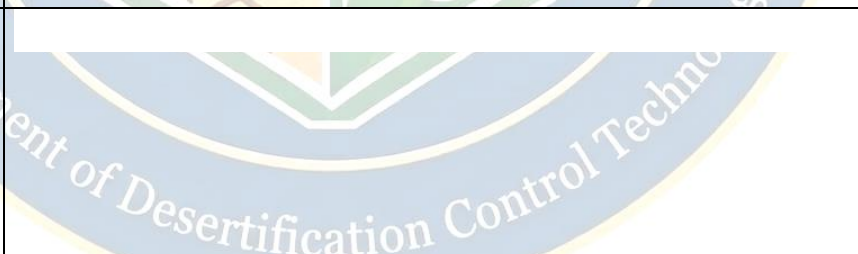
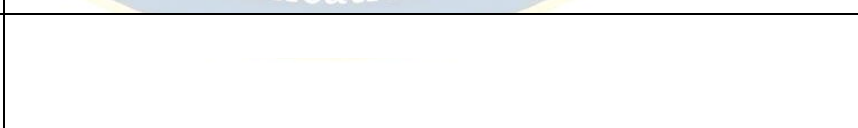
226. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory2 3 practical	A1, B1 / The student should be able to define the concept of water collection and analyze the hydrological characteristics of . watersheds	theoretical: Concept and definition of water harvesting practical: Hydrological diagram of the watershed area Hydrological characteristics of the region	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the second	Theory2 3 practical	B1 / The student should be able to explain the hydrological aspects and apply surface runoff . models	:theoretical Hydrological aspects of water harvesting practical: Surface runoff models for large and small catchments Water collection method Water collection method	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the third	Theory2 3 practical	A1, B1 / The student should be able to distinguish methods and techniques for collecting water and analyze methods for improving surface . runoff	theoretical: Water collection methods and techniques practical: Method for improving surface runoff in a watershed area	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions

Fourth	Theory2 3 practical	A1/ The student should be able to explain methods of stimulating surface runoff and identify catchment . areas	theoretical: Methods of stimulating surface runoff practical: Defining the watershed area	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Fifth	Theory2 3 practical	B1 / The student should be able to identify suitable areas and plan a preliminary . collection system	theoretical: Identifying suitable areas for water collection practical: System planning and design	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Sixth	Theory2 3 practical	A1, B1 / The student should be able to explain the steps of designing systems and applying the water collection process .	theoretical: Planning and design of water harvesting systems practical: Water collection	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Seventh	Theory2 3 practical	B1 / The student should be able to explain water storage techniques and apply the design of a . practical system	theoretical: Storage of collected water practical: System planning and design	:Theoretical Auditory methods: the method of writing on ,the board the method	,Short quizzes homework ,assignments discussions

				of direct dialogue :My work Assigning tasks and reporting	
Eighth	Theory2 3 practical	A1, B1 / The student should be able to analyze the importance of water collection and its economic and social benefits .	:theoretical Importance and benefits of water harvesting practical: Water collection	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Ninth	Theory2 3 practical	A1/ The student should be able to apply the hydrological aspects in the design of systems .	:theoretical Hydrological aspects of water harvesting practical: System planning and design	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
tenth	Theory2 3 practical	B1 / The student must be able to explain the steps of implementation and maintenance and apply the . assembly process	:theoretical Implementation operation and maintenance of water collection systems practical: Water collection	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
eleven th	Theory2	A1/ The student should be able to	theoretical: Social and economic issues	:Theoretical Auditory	,Short quizzes homework

	3 practical	evaluate the social and economic dimensions of water harvesting . projects	practical: System planning and design	methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
twelfth	Theory2 3 practical	B1 / The student should be able to conduct a cost-benefit analysis of water harvesting . projects	theoretical: Cost and benefit analysis of water harvesting practical: Water collection	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
thirteenth	Theory2 3 practical	A1, B1 / The student must be able to prepare an economic feasibility study and apply storage . methods	theoretical: Economic feasibility analysis practical: Storage of collected water	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
fourteenth	Theory2 3 practical	A1/ The student should be able to analyze the benefits through a practical case . study	theoretical: Benefits of water collection practical: Case study	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
fifteen th	Theory2 3 practical	B1 / The student should be able to estimate and analyze costs within a practical . project	theoretical: Water collection costs practical: Water collection cost analysis	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
227. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
228. Learning and teaching resources					
Required textbooks (curriculum) books, (available		if			
Main references (sources)					
Recommended books and references scientific) journals and (...reports					
Electronic references and websites					

Course description template

229. :Course name					
soil maintenance					
230. Course code:					
DES304					
231. semester / year					
232. Date of preparation of description					
2024/9/1					
233. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
234. Number of credit hours (total) / Number of units (total)					
hours (2 theory + 3 practical)* 15 weeks 75					
235. Name of the course coordinator (list all names, if there is more than one)					
the name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq					
236. Course objectives					
Goals		The student should be able to identify the elements of water .1 .management in arid regions The student should be able to understand the relationship .2 between plants and the ecosystem and climatic elements in .arid regions The student should be able to identify plant succession, the .3 .climatic regions of Iraq, and the types of environment in it			
237. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
238. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method

the first	Theory2 3 practical	A1, B1 / The student should be able to explain the concept of soil and water conservation and analyze rainfall data	:theoretical Introduction - The Concept of Soil and Water Conservation :practical Rainfall data analysis	:Theoretical Auditory methods: the method of writing on the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the second	Theory2 3 practical	A1, B1 / The student should be able to explain the characteristics of rain and apply methods for measuring surface flow rate	:theoretical - Rain - Types of Rain Physical Properties of Rain - Physics of Precipitation :practical The logical method for measuring the maximum surface flow rate	:Theoretical Auditory methods: the method of writing on the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the third	Theory2 3 practical	B1 / The student should be able to analyze the factors affecting surface runoff and calculate the depth of disturbance	:theoretical - Surface runoff Factors affecting surface runoff :practical A direct method for calculating the depth of surface disturbance	:Theoretical Auditory methods: the method of writing on the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Fourth	Theory2 3 practical	A1/ The student should be able to compare surface runoff analysis methods and apply	:theoretical Methods of surface runoff analysis :practical	:Theoretical Auditory methods: the method of writing on	,Short quizzes homework ,assignments discussions

		physical models of . corrosion	Predicting water erosion/models based on physical principles	,the board the method of direct dialogue :My work Assigning tasks and reporting	
Fifth	Theory2 3 practical	B1 / The student should be able to explain water erosion and its types and apply statistical models . to predict it	:theoretical Water erosion - its concept - its types - its mechanisms :practical Water erosion prediction/models based on statistical principles	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Sixth	Theory2 3 practical	A1/ The student should be able to explain the universal equation and apply the inR andK factors the field	:theoretical Global soil loss ratio equation :practical The general equation for the percentage of soil loss due to water R ,K erosion - factor	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Seventh	Theory2 3 practical	A1, B1 / The student should be able to evaluate erosion control methods and apply the equations of andS the factors L.	:theoretical Methods of combating water erosion :practical The general equation for the percentage of soil loss due to water andS erosion – factors L	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Eighth	Theory2 3 practical	B1 / The student should be able to explain wind erosion and practically apply the equations of . water erosion	:theoretical The relationship between erosion and soil productivity :practical The general equation for the percentage of soil loss due to water andP erosion - factors C	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Ninth	Theory2 3 practical	A1/ The student should be able to explain wind erosion and practically apply the equations of . water erosion	:theoretical Wind erosion - its concept and mechanisms :practical Applying the general equation for the percentage of soil loss due to water erosion in the field	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
tenth	Theory2 3 practical	A1/ The student should be able to explain the mechanisms of wind erosion and calculate them using the general . equation	:theoretical Wind erosion - its concept and mechanisms :practical The general equation for wind erosion	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
eleven th	Theory2	B1 / The student should be able to	:theoretical	:Theoretical Auditory	,Short quizzes homework

	3 practical	evaluate methods of combating wind erosion and link them to field . observation	Methods of combating wind erosion - Wind erosion control :practical A field tour to observe the manifestations of water erosion	methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
twelfth	Theory2 3 practical	A1, B1 / The student should be able to identify institutions and facilities and WEE apply the equation.	:theoretical Soil and water institutions, permanent and temporary facilities for soil and water conservation :practical The general equation for wind erosion (WEE)	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
thirteenth	Theory2 3 practical	A1, B1 / The student should be able to prepare a plan for soil and water conservation and apply the equations in the . field	:theoretical Soil and water conservation planning :practical Applying the general equation for wind in the (WEE) erosion field	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
fourteenth	Theory2 3 practical	A1, B1 / The student should be able to analyze the problem of sand dunes and apply methods of controlling them . practically	:theoretical Sand dunes and methods of controlling .them :practical Applying the general equation for wind in the (WEE) erosion field	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
fifteen th	Theory2 3 practical	A1, B1 / The student should be able to discuss methods of combating wind erosion and evaluate solutions through applied educational . materials	:theoretical Methods of combating wind erosion - Wind erosion control :practical Films and slides about wind erosion	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
239. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
240. Learning and teaching resources					
Required textbooks curriculum) books, (available		if			
Main references (sources)		Fundamentals of Database Systems 6 th edition Ramez Elmasri			
Recommended books and references scientific) journals and (...reports		Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials			
Electronic references and websites		https://www.pdfdrive.com/			

Course description template

241. :Course name	
Irrigation and drainage principles	
242. Course code:	
DES305	
243. semester / year	
244. Date of preparation of description	
2024/9/1	
245. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
246. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
247. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub :e-mail Samir.f.ayoub@ntu.edu.iq	
248. Course objectives	
Goals	1. The student should be able to explain the importance of water reuse and its role in achieving water security and environmental sustainability. 2. The student should be able to distinguish between different sources of reclaimed water and various reuse technologies. 3. The student should be able to analyze the health and environmental standards related to water reuse. 4. The student should be able to apply water treatment methods and techniques to qualify it for agricultural and industrial use.
249. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
250. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory2	A1, B1 / The student should be able to define recycled water and explain its various . sources	:theoretical The concept of recycled water. Water sources used include ,surface runoff wastewater, and high .groundwater	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
the second	Theory2	A1, B1 / The student should be able to distinguish and evaluate irrigation water . reuse methods	:theoretical Methods used to reuse all types of irrigation water	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
the third	Theory2	B1 / The student should be able to describe the processing operations and identify the basic . criteria for reuse	:theoretical Wastewater treatment processes, standards and principles of reuse methods	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Fourth	Theory2	A1/ The student should be able to analyze pollution standards and explain methods of reusing poor . quality water	:theoretical Poor quality irrigation water (pollution standards, reuse standards and methods; suitable (irrigation methods	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

Fifth	Theory2	A1, B1 / The student should be able to evaluate irrigation methods suitable for low-quality water and apply them in practical situations .	:theoretical Poor quality irrigation water (pollution standards, reuse standards and methods; suitable (irrigation methods	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Sixth	Theory2	A1, B1 / The student should be able to explain and compare low-cost technology applications with traditional . methods	:theoretical Low-cost technology for water reuse	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Seventh	Theory2	A1, B1 / The student should be able to identify the characteristics of wastewater and the sources of . pollutants in it	:theoretical .Wastewater, sewage Wastewater :characteristics components and sources of pollutants in wastewater	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Eighth	Theory2	B1 / The student should be able to compare different treatment methods and explain the role of oxidation . lakes	:theoretical Wastewater treatment processes. Methods of water disposal and reuse. Selection of .treatment methods .Treatment stages Oxidation and .stabilization ponds	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Ninth	Theory2	A1, B1 / The student should be able to evaluate the advantages and disadvantages associated with . oxidation lakes	:theoretical Advantages and importance of .oxidation lakes Disadvantages of .oxidation lakes	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
tenth	Theory2	A1/ The student should be able to		:Theoretical Auditory	,Short quizzes homework

		analyze the factors affecting the operational efficiency of . oxidation lakes	: Theoretically Sanitation considerations: Factors affecting the operation .of oxidation ponds	methods: the method of writing on ,the board the method of direct dialogue	,assignments discussions
eleven th	Theory2	The student should be able to ,define sludge explain its types and methods of . reuse	:theoretical Sludge reuse (solid sludge): What is ?sludge and its types	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
twelfth	Theory2	A1, B1 / The student should be able to analyze the chemical composition of sludge and evaluate the feasibility of using . it in agriculture	:theoretical Its chemical composition. The use .of sludge as fertilizer	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
thirteen th	Theory2	B1 / The student should be able to discuss the biological and toxicological risks associated with the reuse of water . and sludge	:theoretical Risks of using treated wastewater and sludge in irrigation and agriculture, biological hazards, toxins and hazards of toxic .substances	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
fourteen th	Theory2	A1/ The student should be able to explain the applications of reuse in ,agriculture industry and groundwater . recharge	:theoretical Reuse of wastewater for groundwater recharge and replenishment, and for agricultural and .industrial water use	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
fifteen th	Theory2	A1/ The student should be able to evaluate tertiary treatment	:theoretical Use of tertiary ,treatment (filtration absorption, reverse	:Theoretical Auditory methods: the method of	,Short quizzes homework ,assignments discussions

		techniques and analyze the benefits of water . reuse	:osmosis) Material Wastewater use and recycling and its .benefits	writing on ,the board the method of direct dialogue	
251. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
252. Learning and teaching resources					
Required textbooks curriculum) books, (available	if				
Main references (sources)		Fundamentals of Database Systems 6 th edition Ramez Elmasri			
Recommended books and references scientific) journals and (...reports		Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials			
Electronic references and websites		https://www.pdfdrive.com/			

Course description template

253. :Course name	
Groundwater management	
254. Course code:	
DES306	
255. semester / year	
256. Date of preparation of description	
2024/9/1	
257. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
258. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
259. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
260. Course objectives	
Goals	The student should be able to identify the .1 .elements of water management in arid regions The student should be able to understand the .2 relationship between plants and the ecosystem and .climatic elements in arid regions The student should be able to identify plant .3 succession, the climatic regions of Iraq, and the .types of environment in it
261. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills
262. Course structure	

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory2 3 practical	A1, B2 / The student should be able to define groundwater and explain its importance and . cycle in nature	:theoretical Introduction to groundwater – its ,importance, sources . and the water cycle :practical A laboratory visit to learn about groundwater . measurement tools	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the second	Theory2 3 practical	A1, B2 / The student should be able to describe the characteristics of groundwater and the layers of . the water basin	:theoretical Natural and artificial . groundwater sources :practical Locating existing wells and analyzing . their characteristics	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the third	Theory2 3 practical	B2 / The student should be able to distinguish between the different sources . of groundwater	:theoretical Drilling and well construction: types and operating mechanisms :practical Practical exercise on drawing a well . diagram	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions

Fourth	Theory2 3 practical	A1/ The student should be able to design a well and understand the different types of . drilling	:theoretical Drilling and well construction: types and operating mechanisms . :practical Practical exercise on drawing a well . diagram	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Fifth	Theory2 3 practical	A1, B1 / The student should be able to choose the appropriate irrigation method using groundwater .	:theoretical Irrigation methods using groundwater sprinkler and drip) . (irrigation :practical A practical experiment on a drip irrigation system linked to a well .	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Sixth	Theory2 3 practical	A1/ The student should be able to accurately calculate the groundwater . reserves	:theoretical Assessing groundwater quantities: calculations . and measurements :practical Measuring the water level in a well using measuring instruments .	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Seventh	Theory2 3 practical	A1, B1 / The student should be able to assess the quality of groundwater and	:theoretical :Groundwater quality ,salinity, minerals . chemical indicators :practical	:Theoretical Auditory methods: the method of writing on	,Short quizzes homework ,assignments discussions

		its suitability for . agricultural use	Laboratory analysis of water samples to . determine quality	,the board the method of direct dialogue :My work Assigning tasks and reporting	
Eighth	Theory2 3 practical	B1 / The student should be able to identify problems of attrition and suggest solutions . to reduce them	:theoretical The student should be able to assess the quality of groundwater and its suitability for . agricultural use :practical A case study of areas affected by excessive . depletion	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Ninth	Theory2 3 practical	A1/ The student should be able to propose strategies for protecting . groundwater	:theoretical Methods of protecting and sustaining . groundwater :practical Applying models to protect the water basin . from pollution	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
tenth	Theory2 3 practical	A1, B2 / The student should be able to link groundwater consumption to agriculture and demand . management	:theoretical The relationship between groundwater and agriculture in arid . regions :practical	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

			Analysis of water usage data in a model . farm	:My work Assigning tasks and reporting	
eleven th	Theory2 3 practical	B2 / The student should be able to diagnose pollution and appropriate treatment methods .	:theoretical Pollution and methods of treating . groundwater :practical Studying and laboratory processing of contaminated . samples	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
twelfth	Theory2 3 practical	A1, B2 / The student should be able to apply sustainable irrigation methods using groundwater	:theoretical Sustainable irrigation and water reuse strategies :practical A simulation experiment of a sustainable irrigation . system	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
thirteenth	Theory2 3 practical	B2 / The student should be able to integrate subterranean knowledge into environmental and engineering . planning	:theoretical Groundwater management in environmental and . engineering planning :practical Develop a simple plan for managing water resources for a particular farm or area .	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
fourteenth	Theory2 3 practical	A1, B2 / The student should be able to use modern technologies to	:theoretical Modern technologies in groundwater	:Theoretical Auditory methods: the method of	,Short quizzes homework ,assignments discussions

		monitor and manage . groundwater	(GIS – management Remote Sensing). :practical toGIS software Using analyze the water . basin data	writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	
fifteen th	Theory2 3 practical	B2 / The student must be able to integrate his theoretical and practical knowledge to manage groundwater . sustainably	General review	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions

263. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

264. Learning and teaching resources

Required curriculum books, if (available)	
Main references (sources)	Fundamentals of Database Systems 6 th edition Ramez Elmasri
Recommended books and references (scientific (...journals and reports	Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials
Electronic references and websites	https://www.pdfdrive.com/

Course description template

265. :Course name	
Sustainable development in desert regions	
266. Course code:	
DES307	
267. semester / year	
268. Date of preparation of description	
2024/9/1	
269. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
270. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
271. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq	
272. Course objectives	
Goals	1. The student should be able to explain the concept of sustainable development and its goals in the context of desert environments. 2. The student should be able to analyze the natural, economic and social characteristics of desert regions. 3. The student should be able to assess environmental challenges such as water scarcity, desertification, and soil degradation in desert areas. 4. The student should be able to apply modern strategies and methods for managing natural resources in desert environments.
273. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
274. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory2	A1, B2 / The student should be able to define sustainable development and explain its ,environmental economic and social dimensions	:theoretical Introduction to Sustainable Development	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the second	Theory2	A1, B2 / The student should be able to describe the natural characteristics of desert areas and identify their impact on . development	:theoretical Environmental characteristics of desert regions	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
the third	Theory2	A1, B2 / The student should be able to analyze the most prominent environmental and social challenges . in desert areas	:theoretical Environmental and social challenges	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Fourth	Theory2	B2 / The student should be able to discuss the most important strategies applied to achieve sustainable	:theoretical Sustainable development strategies	:Theoretical Auditory methods: the method of writing on ,the board the method	,Short quizzes homework ,assignments discussions

		development in arid environments		of direct dialogue	
Fifth	Theory2	A1/ The student should be able to explain the role of renewable energy in supporting sustainable development in . desert areas	theoretical: Renewable energy: using solar and wind power	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
Sixth	Theory2	B2 / The student should be able to explain the importance of education and training in raising awareness and promoting community . participation	theoretical: The role of education and training in sustainable development	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Seventh	Theory2	A1, B2 / The student should be able to analyze the relationship between economic and social development and . sustainability	theoretical: Economic and social development	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Eighth	Theory2	A1, B2 / The student should be able to evaluate the role of policies and good governance in managing natural	theoretical: Policies and Management	:Theoretical Auditory methods: the method of writing on ,the board the method	,Short quizzes homework ,assignments discussions

		resources in . deserts		of direct dialogue :My work Assigning tasks and reporting	
Ninth	Theory2	A1/ The student should be able to present examples of case studies in sustainable desert . development	theoretical: Case studies	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
tenth	Theory2	B2 / The student should be able to explain the importance of scientific research and development in supporting sustainable development . projects	Research and Development	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
eleven th	Theory2	A1, B2 / The student should be able to analyze real-world examples of sustainable development applications in . desert areas	theoretical: Analysis of successful case studies of sustainable development applications in different desert regions .	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
twelfth	Theory2	A1/ The student should be able to use research and evaluation tools to understand development problems in desert . areas	theoretical: Research and evaluation tools used in studying environmental and . social problems	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
thirteenth	Theory2	A1/ The student must be able to prepare a	theoretical: Designing a sustainable development project	:Theoretical Auditory methods: the	,Short quizzes homework

		sustainable development project proposal that is compatible with the characteristics of a . desert region	that is tailored to the needs of a specific . desert region	method of writing on ,the board the method of direct dialogue	,assignments discussions
fourteenth	Theory2	A1/ The student should be able to discuss the role of innovation and technology in addressing desert . challenges	:theoretical Innovations and modern technology and their role in improving conditions .in desert regions	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions
fifteenth	Theory2	A1, B2 / The student should be able to assess the position of sustainable development in global and local policies and link it to the local reality	:theoretical The importance of sustainable development in global and local contexts	:Theoretical Auditory methods: the method of writing on ,the board the method of direct dialogue	,Short quizzes homework ,assignments discussions

275. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

276. Learning and teaching resources

Required textbooks curriculum) books, (available if	
Main references (sources)	Fundamentals of Database Systems 6 th edition Ramez Elmasri
Recommended books and references scientific) journals and (...reports	Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials



Course description template

277. :Course name	
Recycling agricultural waste	
278. Course code:	
TAMO351	
279. semester / year	
First semester	
280. Date of preparation of description	
2024/9/1	
281. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
282. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
283. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
284. Course objectives	
Goals	☐ Introducing students to the sources and types of agricultural waste. ☐ Clarifying the environmental problems resulting from the accumulation of waste. • To equip students with basic skills in recycling waste to produce fertilizer, animal feed, and energy . Developing the ability to use modern technologies in processing agricultural waste. • Raising awareness of the role of recycling in achieving sustainable development and protecting the environment.
285. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

6. .Assigning teamwork to reveal leadership skills

286. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A2, B2 / The student should be able to understand an introduction to agricultural waste : ,its concept importance, and production volume in agricultural .environments	:theoretical General introduction to agricultural waste. :practical Collecting and sorting samples of waste.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B2 /N The student should be able to know Classification of agricultural waste : ,plant, animal and industrial waste related to the agricultural sector.	:theoretical Classification of plant and animal waste :practical Drying and grinding plant waste.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A2/ The student should be able to know Environmental impact of waste accumulation: Environmental pollution and health problems.	:theoretical The environmental and health impact of waste accumulation. :practical Preparing the compost first stage: mixing) (and stacking.	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
				:My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A2, B2 / The student should be able to know Primary processing of waste: ,collection sorting, drying and grinding.	:theoretical Primary processing ,methods (collection (sorting, grinding. :practical composting process second stage: turning) (and aeration.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	B2 / The student should be able to know Recycling plant waste: manufacturing compost and organic fertilizers.	:theoretical Recycling to produce organic fertilizer (Compost). :practical	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	B2 / The student should be able to know Recycling animal waste: Production of biogasand organic fertilizer.	:theoretical Biorecycling for biogas production. :practical Measuring the maturity indicators of compost(,temperature ,humiditypH).	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Seventh	2 Theory 3 practical	A2, B2 / The student should be able to know Production of animal feed from agricultural waste : processing techniques to improve nutritional value.	:theoretical Using waste as animal feed. :practical A miniature biodigester for producing biogas.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A2/ The student should be able to know Using waste to produce energy: ,biofuel biogas, and direct combustion.	:theoretical Recycling to produce energy. :practical Setting up a miniature biodigester for biogas production.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	B2 / The student should be able to know Modern recycling technologies: ,biotechnology microbial and enzyme processing.	:theoretical Biotechnology in recycling. :practical Measuring biogas production and analyzing its components.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 3 practical	A1/ The student should be able to know Production of industrial materials from waste: ,paper ,artificial wood building materials	:theoretical Waste as a source of industrial materials ,wood, paper) (building materials. :practical Experiment to produce animal feed from plant peels or waste chemical/biological) (treatments.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	B2 / The student should be able to know Environmental laws and regulations: Regulating the management of agricultural waste	:theoretical Environmental legislation regulating waste management. :practical Producing liquid fertilizer(Biofertilizer) from waste.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ The student should be able to know Recycling and its role in sustainable development: the economic and social dimension.	:theoretical Local and global case studies. :practical Recycling waste paper to produce recycled paper.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen nth	2 Theory 3 practical	A2/ The student should be able to know How to prepare small	:theoretical Recycling and sustainable development.	:Theoretical Auditory :methods the method	Short ,quizzes homework

		industrial models compressed) panels made of palm fronds or (straw	:practical Preparing small industrial models compressed panels) made of palm fronds (or straw	of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
fourteen th	2 Theory 3 practical	/ A2, B2 Presentation of student research and reports.	:theoretical Student presentations. :practical Discussion of practical reports from student groups.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteen th	2 Theory 3 practical	/ A2, B2 Comprehensive review and preparation for the final exam.	:theoretical A comprehensive review. :practical + Final practical exam evaluation of student projects.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
287. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
288. Learning and teaching resources					
Required curriculum books, if (available		textbooks books, if)			

Main references (sources)	☐ FAO. (2017). <i>Agricultural Waste Management: Towards Circular Economy</i> . Rome: FAO. ☐ Diaz, L. F., & Savage, G. M. (2019). <i>Composting and Recycling Municipal Solid Waste</i> . CRC Press.
Recommended books and references (scientific (...journals and reports	
Electronic references and websites	



Course description template

289. :Course name	
organic farming	
290. Course code:	
TAMO352	
291. semester / year	
First semester	
292. Date of preparation of description	
2024/9/1	
293. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
294. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
295. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan :e-mail Mti.lec224.omar@ntu.edu.iq	
296. Course objectives	
Goals	☐ Introduce the student to the concept of agriculture and its importance in food security and the economy. ☐ Understanding the scientific foundations of agricultural operations (soil, water, plants). Developing the student's skills in dealing with agricultural tools and field operations. • ,Gaining practical experience in land preparation, planting irrigation, fertilization, and harvesting. • Promoting awareness of sustainable agricultural practices and protecting natural resources
297. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

298. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B2 / The student should be able to He explains importance Agriculture and its role The economist , and recognizes on Tools agricultural	:theoretical introduction on Agriculture Its importance in Security food The economy :practical identification on Tools and equipment agricultural	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B2 / The student should be able to explain the evolution of agricultural practices throughout history and apply the skill of collecting soil .samples	:theoretical collection Samples from soil and recognition on Its characteristics :practical date Agriculture and its development	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B2 / The student should be able to analyze the effect of climate, soil, and water on production, and apply soil .properties testing	:theoretical Factors environmental Influential in Production Agricultural (climate – soil – water) :practical analysis basic For samples Soil (texture – color – pH)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Fourth	2 Theory 3 practical	A1, B2 / The student should be able to explain the properties of the soil and apply the steps for preparing land for .cultivation	:theoretical features soil agricultural and ways Improving it :practical to prepare land experimental For agriculture	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to distinguish between different irrigation methods and try applying them in .the field	:theoretical application practical For irrigation (surface – sprinkler – drip) :practical sources waters Irrigation and ways Irrigation (traditional) (and modern)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B2 / The student should be able to identify the types of seeds and methods of propagation and apply practical farming .techniques	:theoretical an experience sowing And planting seedlings in basins or pots :practical seeds and seeds and ways Excessive	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1, B2 / The student should be able to explain	:theoretical	:Theoretical Auditory :methods	Short ,quizzes homework

	3 practical	the basic agricultural processes and observe the growth of seedlings .practically	tracking germination seeds and growth My work with seedlings : Operations Agricultural (plowing - sowing - maintenance - fertilization)	the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
Eighth	2 Theory 3 practical	A1, B2 / The student should be able to explain pest control strategies and apply a practical .experiment	:theoretical an experience Combat pests on plants laboratory :practical Combat pests Agricultural (Biological - Chemical)	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, B2 / The student should be able to distinguish between field crops and prepare a report on the .visit	:theoretical crops Field crops (cereals - legumes - fodder) :practical visit field crops Field / Experimental	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory 3 practical	A1, B2 / The student should be able to describe vegetable crops and evaluate their cultivation techniques in the .field	:theoretical crops Green Basic :practical visit farm Greenhouse / field	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue :My work Assigning tasks and reporting	
eleven th	2 Theory 3 practical	A1, B2 / The student should be able to identify the types of fruit crops and observe the methods of managing them in the field	:theoretical crops fruit :practical visit grove fruit local	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B2 / The student should be able to explain the importance of industrial crops and write a .scientific report	:theoretical crops Industrial (cotton - sugarcane - sunflower) :practical numbers a report field on visit agricultural	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen th	2 Theory 3 practical	A1, B2 / The student should be able to link agriculture and the environment and apply the principle of sustainability in a .practical project	:theoretical Agriculture Sustainable and practices friend For the environment :practical project Miniature : Agriculture plants in pots or house plastic small	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
fourteenth	2 Theory 3 practical	A1, B2 / The student should be able to analyze case studies and present their project with collaborative skill	:theoretical studies condition Local Offers students :practical an offer results Projects The process and discussing it	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B2 / The student should be able to integrate their knowledge and skills in a final exam and evaluate their project	:theoretical review General and readiness For the exam Final :practical a test practical ultimate Evaluation Projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

299. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

300. Learning and teaching resources

Required textbooks curriculum) (books, if available	
Main references (sources)	- Acquaah, G. (2012). <i>Principles of Crop Production: Theory, Techniques, and Technology</i> . Pearson. - FAO. (2019). <i>Sustainable Crop Production Intensification</i> . Rome: FAO
Recommended books and	

references scientific) journals and (...reports	
Electronic references and websites	



Course description template

301. :Course name	
gardening	
302. Course code:	
DES351	
303. semester / year	
304. Date of preparation of description	
2024/9/1	
305. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
306. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
307. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan	
:e-mail Mti.lec224.omar@ntu.edu.iq	
308. Course objectives	
Goals	1. Introducing the student to the concept of horticulture and the types of horticultural crops (vegetables, fruits, ornamental plants). 2. Understanding the scientific principles of horticultural plant cultivation and management. 3. Developing practical skills in the cultivation and propagation of horticultural plants. 4. To equip the student with the ability to care for horticultural crops and combat diseases and pests. 5. Promoting awareness of the principles of sustainable gardening and sound environmental practices.
309. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training

			4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. Assigning teamwork to reveal leadership .skills		
310. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B2 / The student should be able to explain the importance of gardening and identify the tools and equipment.	:theoretical An introduction to horticulture and its economic and nutritional importance :practical Learn about gardening tools and equipment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B1 / The student should be able to explain the effect of environmental factors on growth and analyze the soil practically.	:theoretical Identifying the types of horticultural crops ,vegetables, fruits) (ornamental plants. :practical Practical analysis of soil properties	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1/ The student must be able to apply soil preparation practically.	:theoretical Environmental factors affecting the growth of horticultural plants. :practical	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework ,assignments discussions

			Preparing the soil or pots for planting	method of direct dialogue :My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1/ The student should be able to apply the planting of seeds and monitor their growth.	:theoretical Soil and methods of preparing it for gardening. :practical Seed planting experiment and monitoring germination	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to apply seed planting and monitor its growth.	:theoretical Seeds, seedlings, and propagation methods. :practical Fertilization is applied and its effect is monitored.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1/ The student should be able to practically apply cuttings and grafting of plants.	:theoretical Agriculture and vegetative ,propagation (cuttings (grafting. :practical Practical application of propagation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Seventh	2 Theory 3 practical	B1 / The student should be able to practically apply different types of irrigation.	:theoretical Irrigation and different irrigation methods for horticultural crops. :practical Irrigation of different types	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B2 / The student should be able to apply fertilization and monitor its effect.	:theoretical Fertilization and fertility in horticulture :practical Plant fertilization experiment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, B2 / The student should be able to apply pruning and trimming practically.	:theoretical Pruning and trimming plants. :practical Practical pruning and trimming of plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A1, B2 / The student should be able to apply	:theoretical	:Theoretical Auditory :methods	Short ,quizzes homework

	3 practical	control methods practically.	Pest and disease control in horticultural crops. :practical Controlling simple pests or diseases	the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to grow vegetable crops and assess their growth.	:theoretical Basic vegetable crops. :practical Growing vegetable crops in the field or greenhouse	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1/ The student should be able to grow fruit crops and observe their growth.	:theoretical Important fruit crops. :practical Growing small fruit crops	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen th	2 Theory 3 practical	A1, B2 / The student should be able to grow ornamental plants and apply landscaping skills .	:theoretical Ornamental plants and landscaping. :practical Growing and arranging ornamental plants	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue :My work Assigning tasks and reporting	
fourteen th	2 Theory 3 practical	A1, B2 / The student should be able to practically apply sustainable farming practices.	:theoretical Sustainable agriculture in horticulture and environmental practices. :practical Presenting and discussing student projects.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteen th	2 Theory 3 practical	A1, B2 / The student must be able to present his project and take the final practical exam.	:theoretical General review and student presentations. :practical Final practical test and project evaluation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
311. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
312. Learning and teaching resources					
Required textbooks curriculum books, if (available					
Main references (sources)			□ .Jabr, A(2015). <i>Foundations of Horticulture</i> . :Cairo Dar Al-Marikh.		

	□ .Al-Khatib, M(2010). <i>Principles of Practical Horticulture</i> . Amman: Dar Al-Masirah.
Recommended books and references (scientific journals (...and reports	□ Acquaah, G. (2012). <i>Horticulture: Principles and Practices</i> . Pearson. □ FAO. (2019). <i>Sustainable Horticulture Production</i> . Rome: FAO.
Electronic references and websites	



Course description template

2. :Course name	
Adapted agriculture	
3. Course code:	
DES352	
4. semester / year	
Third semester	
5. Date of preparation of description	
2024/9/1	
6. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
7. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 2 practical)* 15 weeks 60	
8. Name of the course coordinator (list all names, if there is more than one)	
Name: Dr. Mohammed Salem Ahmed :e-mail mohameedsa66 @ntu.edu.iq	
9. Course objectives	
Goals	1. The student should be able to explain the concept of adapted agriculture and its importance in addressing climate change. 2. The student should be able to analyze the environmental factors affecting adapted farming systems. 3. The student should be able to apply modern agricultural techniques suitable for harsh climatic conditions. 4. The student should be able to design agricultural production systems that are adapted to limited water and land resources
10. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

11. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 2 practical	A1, B2 / The student should be able to define adapted ,agriculture explain its objectives and geographical distribution.	– Historical overview - Definition of adapted – agriculture - Objectives and ,purposes - Geographical distribution in the .world and Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 2 practical	A1, B2 / The student should be able to determine the criteria for selecting sites for adapted agricultural facilities.	Principles for establishing climate-controlled agricultural – facilities – location – orientation – area .shape	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 2 practical	A1/ The student should be able to analyze the impact of climatic factors on adapted plant production.	- controlled :agriculture ,temperature, light ,humidityCO2	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Fourth	2 Theory 2 practical	A1, B2 / The student should be able to distinguish between agricultural environments and choose the most suitable one for adapted agriculture.	Soil factors affecting plant growth in - adapted agriculture types of growing .media	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 2 practical	A1/ The student should be able to describe methods of creating plastic tunnels and apply a miniature practical model.	Construction of plastic tunnels and :plastic greenhouses ,their shapes, types and plastic .specifications	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 2 practical	A1, B2 / The student should be able to compare greenhouses with plastic ones and identify the uses.	Construction of greenhouses: their shapes, types, and .types of glass	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Seventh	2 Theory 2 practical	A1, B2 / The student should be able to explain the temperature and ventilation control systems and apply some calculations.	,Methods of heating cooling, and ventilating air-conditioned homes	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 2 practical	A/ The student must be able to prepare a nursery inside a plastic greenhouse and produce seedlings .	Producing vegetable seedlings in tunnels and climate-controlled .houses	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 2 practical	A1/ The student must be able to carry out a farming experiment in an alternative soil system.	Indoor greenhouse :farming systems basin farming, ring farming, straw ,farming, bag farming ,rockwool farming .hydroponics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

tenth	2 Theory 2 practical	A1/ The student should be able to explain the production stages of tomatoes and apply them practically.	Production of some :vegetable crops . Tomato production	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 2 practical	A1/ The student should be able to identify and manage the requirements for peppers and eggplants inside homes.	Production of some :vegetable crops production of peppers .and eggplants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 2 practical	A1/ The student should be able to compare the requirements of cucumbers and pumpkins and their practical production.	Production of some :vegetable crops Cucumber and squash production	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory 2 practical	A1, B2 / The student should be able to identify the mushroom production environment and have a practical experience in growing it.	Production of some :vegetable crops Mushroom production	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 2 practical	A1/ The student should be able to apply the principles of strawberry and banana production in adapted agriculture.	Production of some fruit crops: strawberry .production - bananas	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 2 practical	A1, B2 / The student should be able to link theoretical concepts with practical applications in adapted agriculture.	– Historical overview Definition of adapted – agriculture Objectives and .purposes Geographical distribution in the .world and Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
12. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
13.Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

14.:Course name	
wild animals	
15. Course code:	
DES353	
16. semester / year	
First semester	
17. Date of preparation of description	
2024/9/1	
18. Available forms of attendance	
1. .Weekly lesson schedule (theory) 2. Discussions, scientific seminars, and other extracurricular activities	
19. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
20.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Ziad Amer Mustafa	
:e-mail mti.Iec96.Zeyad@ntu.edu.iq	
21. Course objectives	
Goals	☐ Introducing the student to the types of wild animals and their environmental and economic importance. ☐ To identify the anatomical and functional characteristics of different wild animals. ☐ Understanding the role of wild animals in ecosystems and ecological balance. ☐ Acquiring skills in recognizing animal behaviors and methods of monitoring them. ☐ Promoting awareness of conservation, sustainable hunting, and wildlife management.
22.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
23. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A2/ The student should be able to explain the importance of wild animals and identify the tools.	:theoretical Introduction to wild animals and their environmental and economic importance :practical Identifying tools and equipment for environmental monitoring	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	B3 / The student should be able to describe animal diversity and apply practical classification.	:theoretical Classification of wild ,animals (mammals ,birds, reptiles (amphibians :practical Studying preserved animal models or images	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A2, B3 / The student should be able to explain vital functions and apply them practically.	:theoretical Anatomy and vital functions of wild animals :practical Simple anatomical examination of model animals	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A2, B3 / The student should be able to analyze animal behaviors and deduce adaptations.	:theoretical Natural behaviors and environmental adaptations :practical Monitoring animal behavior in the laboratory or reserve	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
Fifth	2 Theory	A2, B3 / The student should be able to practically link food and environmental adaptations.	:theoretical Nutrition and Diet of Wild Animals :practical Field experiment on food sources	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	The student should be able to describe reproduction and analyze the life cycle practically.	:theoretical Diseases and parasites and their effects :practical Field test or medical case study	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A2, B3 / The student should be able to explain the distribution and apply the geographical determination practically.	:theoretical Reproduction and life cycle of wild animals :practical Monitoring pregnancy or eggs in the laboratory	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A2/ The student should be able to identify migration patterns practically.	:theoretical Geographical distribution and environmental habitats :practical Mapping the presence of animals in the field	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A2, B3 / The student should be able to practically	:theoretical	:Theoretical Auditory :methods	Short ,quizzes homework

		assess the impact of human activity on animals.	Migration and movement of wild animals :practical Track animals using tags or cameras	the method of writing on the board, the method of direct dialogue	,assignments discussions
tenth	2 Theory	/ A2, B3 Identifies diseases and their effects and applies knowledge practically.	:theoretical Human interaction and the impact of human activity :practical A local case study of an affected citizen	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	A2, B3 / Explains the laws and evaluates their practical effectiveness.	:theoretical Wildlife protection and national laws :practical Analysis of environmental protection policies	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	B3 / The student should be able to practically link management and environmental balance.	:theoretical Nature Reserves Management :practical Field visit to the reserve	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	B3 / The student must be able to apply scientific observation and write a report.	:theoretical collective field projects :practical Preparing a collective field report	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
fourteenth	2 Theory	A2/ The student should be able to analyze studies and give a group presentation.	:theoretical Local and global case studies :practical Presenting the results of practical projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	A2, B3 / The student must be able to integrate knowledge and skills in the practical test.	:theoretical General review and preparation for the final exam :practical Practical test and evaluation of the field project	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
24. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
25.Learning and teaching resources					
Required textbooks curriculum) books, (available if					
Main references (sources)		- Geist, V. (2011). <i>Wildlife Ecology and Conservation</i> . Cambridge University Press. - FAO. (2018). <i>Sustainable Wildlife Management</i> . Rome: FAO.			
Recommended books and references scientific)					

journals and (...reports	
Electronic references and websites	



Course description template

26.:Course name	
Dryland communities	
27. Course code:	
DES354	
28. semester / year	
First semester	
29. Date of preparation of description	
2024/9/1	
30. Available forms of attendance	
1. .Weekly lesson schedule (theory) 2. Discussions, scientific seminars, and other extracurricular activities	
31. Number of credit hours (total) / Number of units (total)	
32.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Ziad Amer Mustafa :e-mail mti.lec96.Zeyad@ntu.edu.iq	
33. Course objectives	
Goals	1. The student should be able to identify the natural and environmental characteristics that distinguish arid regions. 2. The student should be able to analyze human settlement patterns and the adaptation of local communities to arid conditions. 3. The student should be able to explain the economic, social and environmental challenges facing arid region communities. The student should be able to evaluate sustainable development strategies in these communities.
34.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

35. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1, B1 / The student should be able to define ecology and explain its development and importance.	,Definition of ecology its development, its importance and its relationship to other sciences, and levels of .study of ecology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A1, B1 / The student should be able to classify plant species and explain their relationship to the environment.	Plant species as an ,ecological unit ,classification biological division of ,species environmental degradation, and species .interpenetration	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A1, B1 / The student should be able to describe the role of plants in the ecosystem and its components.	Plants in the Earth's ecosystem, and its environmental .components Solar energy, its transformations, and biogeochemical cycles in the .ecosystem	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A1, B1 / The student should be able to analyze the role of solar energy and biogeochemical cycles.	Plants in the ,biosphere: their role location, level in the energy pyramid, and their relationship to consuming and decomposing .organisms	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fifth	2 Theory	A1/ The student should be able to explain the role of plants in food chains.	,The biosphere ,climatic factors ,factors affecting it methods of heat acquisition and transfer, heat exchange, temporal and spatial variations in temperature, the effect of heat	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A1/ The student should be able to analyze the effect of heat on vegetation cover.	Light, forms of radiation, local variations in light intensity, temporal variations of radiation, its effect on .plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1/ The student should be able to explain the effect of light on plant growth and distribution.	,Wind, its effects types, the impact of ,vegetation on it windbreaks, fires and .their effects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A1/ The student should be able to assess the impact of winds and fires on the plant environment.	Water factor, division of land areas on ,planet Earth, rainfall soil water forms, plant adaptation to water .factor	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A1, B1 / The student should be able to explain the ways in which plants adapt to	,The atmosphere ,climatic zones ,vegetation formations and their distribution .on the Earth's surface	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework ,assignments discussions

		variations in water availability.		on the board, the method of direct dialogue	
tenth	2 Theory	A1, B1 / The student should be able to explain the relationship between climate and plant distribution.	Vegetation cover, its types, stages of development, plant succession, and aquatic organism . succession	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory	A1/ The student should be able to explain the stages of development of plant communities.	Environment and plant communities in ,Iraq, topography ,geographical regions climatic conditions . and plant formations	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	A1/ The student should be able to analyze the plant formations in Iraq and their relationship to the environment.	Studying the relationship between plants and environmental factors and identifying some phenomena during a field trip	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteen nth	2 Theory	B1 / The student must be able to observe and document environmental phenomena in the field.	Measuring soil moisture and its relationship to plant growth and density	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

fourteenth	2 Theory	B1 / The student should be able to use tools to measure soil moisture and salinity and relate them to plant growth.	Measuring salinity and its effect on plant nature and distribution	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	A1, B1 / The student should be able to estimate biomass and analyze its role in the environment.	Measuring the mass of plants, green materials, and plant remains	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
36. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
37.Learning and teaching resources					
Required textbooks curriculum) books, if (available					
Main references (sources)		Required prescribed books Electronic references, Internet sites..			
Recommended books and references scientific) journals and (...reports		Recommended books and references (scientific journals, reports,....)			
Electronic references and websites		Electronic references, Internet sites...			

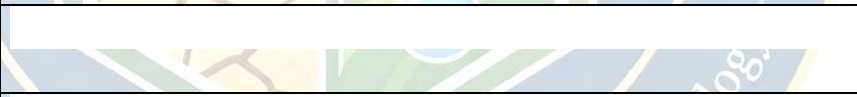
Course description template

38.:Course name	
The relationship between soil, water, and plants	
39. Course code:	
DES356	
40. semester / year	
Third semester	
41. Date of preparation of description	
2024/9/1	
42. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
43. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
44.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Ahmed Fathi : Emailomar.ah.f@ntu.edu.iq	
45. Course objectives	
Goals	1. It explains the physical properties of the soil and their .effect on the movement and distribution of water 2. It explains the relationships between water and soil in terms of field capacity, wilting point, and water available .to the plant 3. It distinguishes between the methods of water movement in the soil (saturation, capillary action, gravity) and their .role in plant nutrition 4. It analyzes the mechanisms by which roots absorb water .and nutrients from the soil 5. It explains the effect of soil properties on water use .efficiency in plant growth 6. It assesses the interactions between soil, water and plants ,under different environmental conditions (drought .(salinity, flooding
46.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming

		3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
47. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	Theory2	A1, B1 / The student should be able to define the relationship ,between soil, water and plants and explain its importance	:theoretical Introduction to the components of the system (soil, water, plants) and its agricultural importance :practical A tour to identify samples (soil, plants)	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the second	Theory2	A1/ The student should be able to explain the effect of texture and structure .on water movement	:theoretical Physical properties of soil ,texture, structure) (porosity :practical Soil texture analysis in the laboratory	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
the third	Theory2	B1 / The student should be able to distinguish the forms of water and determine their importance to plants	:theoretical Water in the soil: Forms of ,water (capillary (gravitational, hygroscopic :practical Experiment to identify water forms in soil samples	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Fourth	Theory2	A1, B1 / The student should be able to measure field capacity	:theoretical Water retention: Field capacity – Wilting point	:Theoretical Auditory methods: the	,Short quizzes homework

		and analyze its relationship to plant .water	:practical Soil field capacity estimation experiment	method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
Fifth	Theory2	A1/ The student should be able to explain the mechanisms of water .movement in the soil	:theoretical :Water movement in soil :infiltration, seepage hydraulic conduction :practical Experiment to measure the infiltration rate using soil columns	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Sixth	Theory2	A1, B1 / The student should be able to distinguish between evaporation and transpiration and their effect on water balance	:theoretical Evaporation and transpiration :practical Experiment to measure evaporation and transpiration rates	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Seventh	Theory2	A1/ The student should be able to perform a simplified .water balance	:theoretical Water balance in soil and plants :practical Water balance calculation for a typical field	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
Eighth	exam				
Ninth	Theory2	B1 / The student should be able to explain the mechanism of water absorption by roots	:theoretical Water absorption by roots :practical Test to measure the rate of water absorption of roots	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue	,Short quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
tenth	Theory2	A1/ The student should be able to describe the pathways of water transport within the plant	:theoretical Water conduction within the plant (xylem and phloem) :practical An illustrative experiment on the movement of water using dyes	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
eleventh	Theory2 practical3	A1, B1 / The student should be able to analyze the effect of water stress on physiological processes	:theoretical The effect of water stress on plants :practical Experiment to expose plants to different levels of drought	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
twelfth	Theory2	A1/ The student should be able to discuss the role of water in the movement of nutrients	:theoretical The relationship between nutrients and water in the soil :practical Experiment on the dissolution and transfer of salts in the soil	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
thirteenth	Theory2	A1, B1 / The student should be able to link humidity to the processes of photosynthesis and respiration	:theoretical Humidity and vital processes (photosynthesis (and respiration) :practical Experiment measuring the rate of photosynthesis under different humidity levels	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
fourteenth	Theory2	A1, B1 / The student should be able to apply methods for	:theoretical Methods for estimating soil moisture	:Theoretical Auditory methods: the	,Short quizzes homework

		measuring soil moisture	:practical or theTDR device Using a gravimetric method to measure humidity	method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
fifteenth	Theory2	A1, B1 / The student should be able to propose water and soil management strategies to improve production	:theoretical Water and soil management strategies :practical Comparative experiment comparing plant productivity under different irrigation systems	:Theoretical Auditory methods: the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,Short quizzes homework ,assignments discussions
48. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
49.Learning and teaching resources					
Required textbooks curriculum) books, (available		if			
Main references (sources)					
Recommended books and references scientific) journals and (...reports					
Electronic references and websites					



Course description template

50.:Course name	
Water reuse	
51. Course code:	
DES357	
52. semester / year	
Third semester	
53. Date of preparation of description	
2025/7/1	
54. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
55. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
56.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan : Email address Mti.lec224.omar@ntu.edu.iq	
57. Course objectives	
Goals	1. It explains the basic concepts of water reuse and its importance in water resource management. 2. It explains the different sources of wastewater and their physical, chemical and biological properties. 3. It distinguishes between different water treatment technologies and methods for adapting them for reuse. 4. It assesses the health and environmental aspects associated with water reuse. 5. It identifies possible agricultural, industrial, and urban applications for water reuse.
58.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

59. Course structure

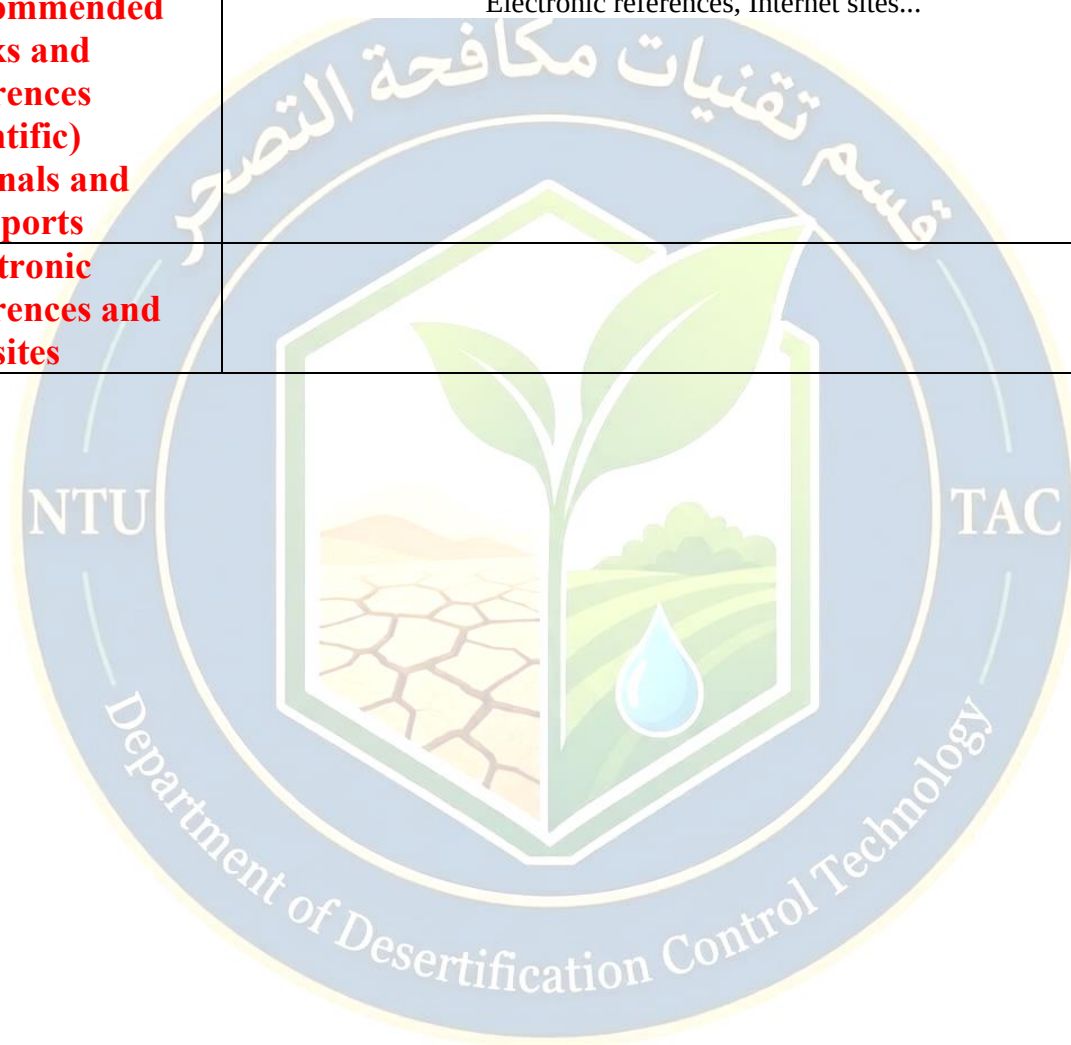
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A2, B1 / The student should be able to define the concept of water reuse and identify its sources.	:theoretical The concept of recycled water. Water sources used include ,surface runoff wastewater, and high .groundwater	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A2, B1 / The student should be able to explain the principles of wastewater treatment and reuse standards.	:theoretical Wastewater treatment processes, standards and principles of reuse methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A2, B1 / The student should be able to analyze the characteristics of poor water and choose the appropriate irrigation methods for it.	:theoretical Poor quality irrigation water (pollution standards, reuse standards and methods; suitable (irrigation methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory	A2, B1 / The student should be able to explain the methods of utilizing saline water for irrigation.	:theoretical Groundwater containing salt and methods for adapting its use in irrigation systems that rely on groundwater as a primary source	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory	A2, B1 / The student should be able to evaluate simple and effective reuse techniques.	:theoretical Low-cost technology for water reuse	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A2, B1 / The student should be able to identify the components of wastewater and its sources of pollution.	:theoretical .Wastewater, sewage Wastewater :characteristics components and sources of pollutants in wastewater	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A2, B1 / The student should be able to explain the stages of wastewater treatment and the application of oxidation ponds.	:theoretical Wastewater treatment processes. Methods of water disposal and reuse. Selection of .treatment methods .Treatment stages Oxidation and .stabilization ponds	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A2, B1 / The student should be	:theoretical	:Theoretical Auditory	Short ,quizzes

		able to compare the advantages and disadvantages of oxidation lakes .	,Advantages importance, and disadvantages of .oxidation lakes	:methods the method of writing on the board, the method of direct dialogue	homework ,assignments discussions
Ninth	2 Theory	A2, B1 / The student should be able to distinguish between methods of water reuse in different irrigation systems .	:theoretical Methods used to reuse all types of irrigation water	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A2, B1 / The student should be able to discuss the environmental and technical factors affecting oxidation lakes.	:theoretical Sanitation considerations; factors affecting the operation of oxidation ponds	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A2, B1 / The student should be able to define sludge and classify its types.	:theoretical Sludge, sludge reuse (solid sludge), what is .sludge and its types	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	A2, B1 / The student should be able to analyze the chemical composition of	:theoretical Its chemical composition. The use of sludge as fertilizer.	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework ,assignments discussions

		sludge and its agricultural applications.		on the board, the method of direct dialogue	
thirteenth	2 Theory	A2, B1 / The student should be able to assess the health and environmental risks of using treated water.	:theoretical Risks of using treated wastewater and sludge in irrigation ,and agriculture ,biological hazards toxins and hazards of .toxic substances	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	A2, B1 / The student should be able to explain the possibilities of reuse in different fields.	:theoretical Reuse of wastewater for groundwater recharge and replenishment, and for agricultural and .industrial water use	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	A2, B1 / The student should be able to describe advanced treatment methods and the benefits of recycling.	:theoretical The use of tertiary ,treatment (filtration absorption, reverse :osmosis) Article ,Wastewater use recycling and its .benefits	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
60. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					

61.Learning and teaching resources	
Required textbooks curriculum) books, if (available	Required prescribed books Electronic references, Internet sites...
Main references (sources)	Recommended books and references (scientific journals, reports,...)
Recommended books and references scientific) journals and (...reports	Electronic references, Internet sites...
Electronic references and websites	



Course description template

62.:Course name	
Desert land management	
63. Course code:	
DES358	
64. semester / year	
Third semester	
65. Date of preparation of description	
2024/9/1	
66. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
67. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
68.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Fares Faisal Abdul Ghani : Email Mti.lec224.omar@ntu.edu.iq	
69. Course objectives	
Goals	The student should be able to: 1. It explains the natural and environmental characteristics of desert lands and the challenges associated with them. 2. It distinguishes between types of desert land in terms of soil, vegetation cover, and water resources. 3. It explains the impact of climatic and geomorphological factors on the fertility and productivity of desert lands. 4. It identifies the main problems associated with desert lands such as salinity, erosion, and desertification. 5. It applies scientific practices to improve and manage soil fertility in desert environments. 6. It employs water harvesting and supplemental irrigation techniques to increase the efficiency of limited water resources.
70.Teaching and learning strategies	

strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
71. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1/ The student should be able to define the desert and its general characteristics.	Introduction to the desert (natural ,characteristics climate, geographical (distribution	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A1/ The student should be able to explain dryland management strategies.	Dryland Management ,Concepts, Strategies) (Challenges	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A1/ The student should be able to analyze methods	Water supply in arid regions (traditional	:Theoretical Auditory :methods	Short ,quizzes homework

		of securing water in the desert.	and non-traditional (sources	the method of writing on the board, the method of direct dialogue	,assignments discussions
Fourth	2 Theory	A1/ The student should be able to explain the role of desert plants in protecting the environment.	The importance of plants in arid lands ,ecological balance) ,soil stabilization (grazing	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory	A1/ The student should be able to classify desert plants according to their characteristics.	Types of desert plants ,annual, perennial) (succulent, thorny	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A1, B1 / The student should be able to compare different methods of reducing sand dunes.	Stopping the encroachment of sand ,dunes (mechanical biological, chemical (methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1, B1 / The student should be able to suggest solutions to	Reducing sandstorms preventive methods) (and damage reduction	:Theoretical Auditory :methods the method	Short ,quizzes homework

		reduce the impact of sandstorms.		of writing on the board, the method of direct dialogue	,assignments discussions
Eighth	2 Theory	A1, B1 / The student should be able to explain strategies for combating desertification.	Reducing desertification combating) – desertification sustainable resource (management	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A1, B1 / The student should be able to identify the potential of desert tourism.	Desert tourism (its ,patterns, components (and challenges	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A1, B1 / The student should be able to evaluate tourism experiences in the deserts.	Desert tourism – practical examples) Arab and international (experiences	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to analyze the economic value of deserts.	The economic importance of deserts ,minerals, agriculture) (pastures	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework ,assignments discussions

				method of direct dialogue	
twelfth	2 Theory	A1/ The student should be able to explain ways of exploiting deserts economically.	The economic importance of deserts ,energy, industries) (services	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	A1, B1 / The student should be able to explain the potential for renewable energy production in deserts.	The possibility of utilizing the desert to produce clean energy solar energy, wind) (energy	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	A1, B1 / The student should be able to evaluate energy projects in deserts.	The potential for utilizing the desert to produce clean energy case studies, existing) (projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	exam			
72. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					

73.Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

313. :Course name					
Scientific research methodology					
314. Course code:					
TAMO400					
315. semester / year					
First semester					
316. Date of preparation of description					
2024/9/1					
317. Available forms of attendance					
1. .Weekly lesson schedule (theory) 2. Discussions, scientific seminars, and other extracurricular activities					
318. Number of credit hours (total) / Number of units (total)					
hours (2 hours of theory)* 15 weeks 30					
319. Name of the course coordinator (list all names, if there is more than one)					
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq					
320. Course objectives					
Goals					
321. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
322. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	:A2, B2 / Theory The student should be able to understand the modern scientific	:theoretical scientific method	:Theoretical Auditory :methods the method of writing on the	Short ,quizzes homework ,assignments discussions

		method and its .steps		board, the method of direct dialogue	
the second	2 Theory	:A2, B2 / Theory The student should be able to understand the assumptions underlying scientific research into natural .phenomena	:theoretical General concepts of the scientific method	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	:A2, B2 / Theory The student should be able to identify the basic characteristics of .scientific research	:theoretical Blind research methodology	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	:A2, B2 / Theory The student should be able to know Types of scientific research and how to apply each of them	:theoretical Types of research and their applications	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory	:A2, B2 / Theory The student should be able to formulate research .hypotheses	:theoretical Steps for preparing scientific research	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Sixth	2 Theory	:A2, B2 / Theory The student should be able to identify the essential characteristics of preparing a successful scientific research paper.	:Theory Characteristics of Successful Research	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	:A2, B2 / Theory The student should be able to identify the tools used to collect information and data in scientific research.	:theoretical Samples and data collection tools	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	:A2, B2 / Theory The student should be able to know Information display tools and devices	:theoretical Methods of presenting information	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	:A2/ Theory The student should be able to understand the physical and technical aspects of the research.	:theoretical Final form of the research	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	:A2, B2 / Theory	:theoretical	:Theoretical Auditory	Short ,quizzes

		The student should be able to understand the organization and classification of information resources in the .library	Using the library in scientific research	:methods the method of writing on the board, the method of direct dialogue	homework ,assignments discussions
eleven th	2 Theory	:A2, B2 / Theory The student should be able to identify computerized and electronic information .sources	:theoretical Information sources and their use in scientific research	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	:A2, B2 / Theory The student should be able to identify paper or traditional sources and how .to access them	Theory: Paper Sources	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteen nth	2 Theory	:A2, B2 / Theory The student should be able to understand and .use the internet	:theoretical Internet and search	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fourteen nth	2 Theory	:A2, B2 / Theory The student should be able to	:theoretical cloud programming	:Theoretical Auditory :methods	Short ,quizzes homework

		understand how to store files .online		the method of writing on the board, the method of direct dialogue	,assignments discussions
fifteen th	2 Theory	monthly exam	monthly exam	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
323. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
324. Learning and teaching resources					
Required textbooks curriculum) books, (available if					
Main references (sources)		Khader, Ahmed Ibrahim (2013). Preparing research papers .and theses from idea to conclusion Mohammed, Fouad Qasim (2012). Scientific Research: From .Preparation to Publication. Mosul University Book House			
Recommended books and references scientific) journals and (...reports		Alley, M (2013).The craft of Scientific Presentations Pages. Cargi , M. and O'Connor P. (2009). Writing Scientific Research Artiches.Wiley-Blackwell.UK Pages.			
Electronic references and websites					

Course description template

325. :Course name	
Design and analysis of experiments	
326. Course code:	
TAMO401	
327. semester / year	
First semester	
328. Date of preparation of description	
2024/9/1	
329. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
330. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
331. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Mohamed Salem Ahmed :e-mail mohameedsa66 @ntu.edu.iq	
332. Course objectives	
Goals	1. It explains the basic concepts of experimental design and the importance of statistical application in scientific research. 2. It distinguishes between different types of experimental designs (complete, incomplete, and chance experiments) and the characteristics of each. 3. It outlines the steps for designing a sound scientific experiment in accordance with the research objectives. 4. Appropriate statistical methods are used to analyze experimental data. 5. It interprets the results of statistical analysis and draws accurate scientific conclusions. 6. It employs specialized statistical software in the .design and analysis of experiments
333. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming

		3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
334. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B2 / The student should be able to explain General ,definitions ,experiment ,design experimental unit ,of work experimental error, conditions for controlling experimental .error	:theoretical ,General definitions ,experiment, design experimental unit of work, experimental error, conditions for controlling .experimental error :practical ,Types of experiments how to plan an experiment, and the qualifications of the .researcher	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B2 / The student should be able to identify the basic rules for designing experiments, the requirements for a ,good experiment and the steps followed in scientific .experiments	:theoretical Basic rules for designing ,experiments requirements for a ,good experiment steps followed in .scientific experiments :practical Excel , spreadsheet and compare the results obtained by analyzing it usingSAS software .	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B2 / The student must be able to Understanding and	:theoretical The design is ,completely random advantages and disadvantages, use of	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework ,assignments discussions

		comprehending :the design completely ,randomized advantages and ;disadvantages using the design when recording one observation per experimental unit, A - in the case of an equal number of iterations, B - in the case of unequal iterations	the design in the case of recording one observation per - experimental unit, A in the case of an equal ,number of repetitions B - in the case of .unequal repetitions :practical The students are then tasked with analyzing various data exercises and preparing weekly .reports on them	on the board, the method of direct dialogue :My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1, B2 / The student should be able to explain the design of the complete random block, the conditions for ,using the design the advantages and disadvantages of the design, the sources of variation, and the basis of how the .block works	:theoretical The design of the completely random block, conditions for ,using the design advantages and disadvantages of the design, sources of variation, and the basis of block .operation :practical Solve exercises on identifying the significance of differences between .averages	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to define the concept of analysis of ,variance determine the number of repetitions, and estimate the missing value (or more) in the .sections	:theoretical ,Analysis of variance determination of the ,number of repetitions and estimation of the missing value (or .more) in the segments :practical Solve the exercises for analyzing data from a complete .random block design	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Sixth	2 Theory 3 practical	A1, B2 / The student should be able to explain the concept of efficiency of the design of completely ,random blocks the design of the Latin square, the ,conditions of use and the advantages and disadvantages of .the design	:theoretical The efficiency of the design of completely random blocks, the design of the Latin square, conditions of use, and advantages and disadvantages of .the design :practical Exercises to find the missing value in complete random .blocks	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	A1, B2 / The student should be able to identify the sources of variance in the ,Latin square ,analyze variance and estimate one or more missing .values	:theoretical Sources of variance in ,the Latin square ,analysis of variance estimation of missing .values or more :practical ,Latin square, design analysis of sources of .contrast	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ The student should be able to understand and comprehend factorial , experiments ,their conditions advantages and .disadvantages	:theoretical Factorial experiments ,their conditions , advantages and .disadvantages :practical Excel spreadsheet and comparing the results obtained by analyzing it using SAS	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
Ninth	2 Theory 3 practical	B1 / The student should be able to identify the sources of variance in factorial , experiments ,analyze variance interaction and its .types	:theoretical , factorial experiments ,analysis of variance interaction and its .types :practical Solve the exercises to analyze the sources of variation in the design .of the Latin square	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory 3 practical	A1/ The student should be able to explain the concept of factorial experiments using a completely randomized .design	:theoretical Factorial experiments using a completely randomized design :practical Solve the exercises for designing factorial . experiments	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to identify factorial experiments using a completely randomized block .design	:theoretical Factorial experiments using a completely randomized block design :practical Excel spreadsheet and comparing the results obtained by analyzing it using SAS	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

twelfth	2 Theory 3 practical	A1, B2 / The student should be able to understand and comprehend the design of the ,partition board ,its requirements advantages, and .disadvantages	:theoretical :Split panel design ,requirements advantages, and disadvantages :practical Excel spreadsheet and comparing the results obtained by analyzing it usingSAS	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory 3 practical	A1, B2 / The student should be able to know Sources of variance in split-plate experiments analysis of variance	:theoretical Sources of variance in split-plate experiments, analysis of variance :practical Excel spreadsheet and compare the results obtained by analyzing them usingSAS.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B2 / The student should be able to use the general ,definitions ,experiment ,design experimental ,work unit experimental error, conditions for controlling experimental error, basic rules for designing ,experiments requirements for a	:theoretical ,General definitions ,experiment, design experimental unit of work, experimental error, conditions for controlling ,experimental error basic rules for ,experimental design requirements for a ,good experiment steps followed in .scientific experiments :practical	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

		,good experiment and the steps followed in scientific .experiments	Excel spreadsheet and compare the results obtained by analyzing them usingSAS.		
fifteen th	2 Theory 3 practical	A1, B2 / The student should be able to use an Excel spreadsheet to design and analyze ,experiments including functions and methods for calculating variances and statistical parameters for analyzing .experiments	:theoretical Excel spreadsheet to design and analyze ,experiments including functions and methods for calculating variances and statistical parameters for .analyzing experiments :practical Discussion of student reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

335. Course evaluation

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and))
((interaction in lectures/ Midterm and final exams

336. Learning and teaching resources

Required curriculum (available)	textbooks books, if)
Main references (sources)	Required prescribed books Electronic references, Internet sites...
Recommended books and references (scientific (...journals and reports	Recommended books and references (scientific journals, reports,...)
Electronic references and websites	Electronic references, Internet sites...

Course description template

337. :Course name	
Field irrigation methods	
338. Course code:	
DES402	
339. semester / year	
First semester	
340. Date of preparation of description	
2024/9/1	
341. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
342. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
343. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Mohamed Salem Ahmed :e-mail mohameedsa66 @ntu.edu.iq	
344. Course objectives	
Goals	1. It explains the basic concepts of field irrigation and the importance of water management in sustainable agriculture. 2. It distinguishes between different irrigation systems and methods (surface irrigation, sprinkler irrigation, drip irrigation) and the characteristics of each. 3. It identifies the factors that influence the selection of the optimal method for field irrigation according to soil type, crop, and climate. 4. It calculates the required irrigation water quantities according to crop needs and the evaporation-transpiration rate. 5. He designs field irrigation networks using appropriate engineering and hydraulic principles. 6. It compares irrigation methods in terms of water .efficiency, costs, and economic feasibility
345. Teaching and learning strategies	
strategy	1. .Interactive lectures

		2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
346. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B2 / The student should be able to explain the concept of field irrigation and identify surface irrigation methods.	:theoretical The meaning of field irrigation, choosing an ,irrigation method field irrigation methods, surface irrigation, basin irrigation :practical Providing information, training and practical experience for the design and implementation of surface irrigation ,methods (panels (strips and culverts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B2 / The student should be able to compare surface irrigation and sprinkler irrigation methods.	:theoretical ,Surface irrigation strip irrigation, and .sprinkler irrigation :practical Introducing the components of the sprinkler irrigation network and various .sprinkler systems	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

the third	2 Theory 3 practical	A1, B2 / The student should be able to evaluate the efficiency of sprinklers under different operating conditions.	:theoretical :Sprinkler irrigation ,its benefits and uses its disadvantages and difficulties :practical Try measuring a sprinkler with one or two nozzles and measure the sprinkler pressure. Try measuring the difference in sprinkler discharge with varying operating pressure. Surface disturbance	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory 3 practical	The student should be able to practically identify the components of the system.	:theoretical Components of a sprinkler irrigation ,system (pumping unit ,pipe network ,sprinklers, valves (gauges :practical A scientific visit to one of the sprinkler irrigation projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B2 / The student should be able to differentiate between systems and evaluate their benefits.	:theoretical Types of sprinkler irrigation systems (fixed and mobile) :practical An experiment to discover the benefits .of sprinkler irrigation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Sixth	2 Theory 3 practical	A1, B2 / The student should be able to calculate the design requirements of a sprinkler irrigation system.	:theoretical Water distribution ,around the sprinkler water distribution patterns :practical Solve problems related to the length and number of irrigation pipes and the number of .movements	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	A1, B2 / The student should be able to operate and maintain the sprinkler irrigation system and be familiar with the drip irrigation system.	:theoretical Installation, operation and maintenance of sprinkler irrigation systems (fixed and (mobile :practical Identifying the components of a drip irrigation system in the laboratory or in the field, determining ,the types of drippers .and calculating costs	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, B2 / The student should be able to design a basic drip grid.	:theoretical Introduction to drip irrigation, definition of drippers, types of drippers, calculating the number of .drippers :practical Calculating expenses ,through closed pipes calculating expenses through a multi-hole .pipe	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory	A1, B2 / The student should be	:theoretical	:Theoretical Auditory	Short ,quizzes

	3 practical	able to describe and evaluate a drip irrigation network in the field.	Classification of the complete drip irrigation network :practical A scientific visit to one of the drip irrigation projects	:methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	homework ,assignments discussions
tenth	2 Theory 3 practical	A1, B2 / The student must be able to operate the irrigation network and adjust the regularity of distribution.	:theoretical Operating the control unit, operating the pipe network operating the drip irrigation systems and filters :practical Field selection experiment for distillation regularity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B2 / The student should be able to apply maintenance and prevention methods.	:theoretical Maintenance of drip irrigation systems treatment of mineral and organic deposits cleaning of drip irrigation systems :practical Connecting the network of pipes that make up the drip irrigation system	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B2 / The student must be able to operate water wells and	:theoretical Operating water wells supplied by irrigation	:Theoretical Auditory :methods the method	Short ,quizzes homework

		connect auxiliary equipment.	and drip irrigation systems :practical Introduction to filtration and injection ,equipment connecting them to the network and .disassembling them	of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
thirteenth	2 Theory 3 practical	A1, B2 / The student should be able to explain the principle of subsurface irrigation and identify smart irrigation.	:theoretical Subsurface irrigation method, how to install, operate and maintain subsurface .irrigation :practical Visiting a smart ,irrigation project learning how it operates, and receiving training on .it	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B2 / The student should be able to analyze smart irrigation applications.	:theoretical Smart irrigation ,method: Installation operation and maintenance of this .method :practical Discussion of student .reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, B2 / The student should be able to integrate his knowledge about irrigation	:theoretical Installation and operation of a drip irrigation system, self-operated	:Theoretical Auditory :methods the method of writing on the	Short ,quizzes homework ,assignments discussions

		systems and their applications.	:practical Films and slides about wind erosion	board, the method of direct dialogue :My work Assigning tasks and reporting				
347. Course evaluation								
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams								
348. Learning and teaching resources								
Required curriculum (available)		textbooks books, if)						
Main references (sources)		Required prescribed books Electronic references, Internet sites...						
Recommended books and references (scientific (...journals and reports		Recommended books and references (scientific journals, reports,...)						
Electronic references and websites		Electronic references, Internet sites...						

Course description template

349. :Course name	
Land reclamation	
350. Course code:	
DES403	
351. semester / year	
First semester	
352. Date of preparation of description	
2024/9/1	
353. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
354. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
355. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq	
356. Course objectives	
Goals	1. To provide students with basic knowledge about the characteristics of degraded lands and their various problems (salinity, alkalinity, structural deterioration...) 2. Introducing students to the scientific methods and modern technologies used in land reclamation and improving its fertility. 3. Enabling students to develop practical land reclamation plans that are consistent with the principles of sustainable agricultural development. 4. Enhancing students' ability to evaluate the efficiency of reclamation methods from a technical, economic, and environmental perspective.
357. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
358. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A2, B2 / The student should be able to explain the concept of field irrigation and identify surface irrigation methods.	:theoretical The meaning of field irrigation, choosing an ,irrigation method field irrigation methods, surface irrigation, basin irrigation :practical Providing information, training and practical experience for the design and implementation of surface irrigation ,methods (panels (strips and culverts	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A2, B2 / The student should be able to explain the effect of climatic factors on wind erosion.	:theoretical ,Surface irrigation strip irrigation, and .sprinkler irrigation :practical Introducing the components of the sprinkler irrigation network and various .sprinkler systems	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A2, B2 / The student should be able to explain the effect of land use and	:theoretical :Sprinkler irrigation ,its benefits and uses its disadvantages and difficulties	:Theoretical Auditory :methods the method of writing	Short ,quizzes homework ,assignments discussions

		topography on wind erosion.	:practical Try measuring a sprinkler with one or two nozzles and measure the sprinkler pressure. Try measuring the difference in sprinkler discharge with varying operating pressure. Surface disturbance	on the board, the method of direct dialogue :My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A2, B2 / The student should be able to analyze soil properties and their relationship to wind erosion.	:theoretical Components of a sprinkler irrigation system (pumping unit, pipe network, sprinklers, valves (gauges :practical A scientific visit to one of the sprinkler irrigation projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A2, B2 / The student should be able to distinguish between types of wind erosion.	:theoretical Types of sprinkler irrigation systems (fixed and mobile) :practical An experiment to discover the benefits of sprinkler irrigation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A2, B2 / The student should be able to explain the basic	:theoretical Water distribution around the sprinkler	:Theoretical Auditory :methods the method	Short ,quizzes homework

		mechanical steps of wind erosion.	water distribution patterns :practical Solve problems related to the length and number of irrigation pipes and the number of .movements	of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	,assignments discussions
Seventh	2 Theory 3 practical	A2, B2 / The student should be able to differentiate between the forms of soil movement by wind.	:theoretical Installation, operation and maintenance of sprinkler irrigation systems (fixed and (mobile :practical Identifying the components of a drip irrigation system in the laboratory or in the field, determining ,the types of drippers .and calculating costs	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A2, B2 / The student should be able to assess risks and set permissible limits for erosion.	:theoretical Introduction to drip irrigation, definition of drippers, types of drippers, calculating the number of .drippers :practical Calculating expenses ,through closed pipes calculating expenses through a multi-hole .pipe	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A2, B2 / The student should be able to explain the basics of soil conservation and erosion control.	:theoretical Classification of the complete drip irrigation network :practical	:Theoretical Auditory :methods the method of writing on the	Short ,quizzes homework ,assignments discussions

			A scientific visit to one of the drip irrigation projects	board, the method of direct dialogue :My work Assigning tasks and reporting	
tenth	2 Theory 3 practical	A2, B2 / The student should be able to choose the appropriate mechanical methods to control erosion.	:theoretical Operating the control unit, operating the pipe network operating the drip irrigation systems and filters :practical Field selection experiment for distillation regularity	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A2, B2 / The student should be able to compare different chemical methods for controlling erosion.	:theoretical Maintenance of drip irrigation systems treatment of mineral ,and organic deposits cleaning of drip irrigation systems :practical Connecting the network of pipes that make up the drip irrigation system	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A2, B2 / The student should be able to explain and apply methods for stabilizing sand dunes.	:theoretical Operating water wells supplied by irrigation and drip irrigation systems :practical	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

			Introduction to filtration and injection ,equipment connecting them to the network and .disassembling them	direct dialogue :My work Assigning tasks and reporting	
thirteenth	2 Theory 3 practical	A2, B2 / The student should be able to assess the economic and social impacts of erosion.	:theoretical Subsurface irrigation method, how to install, operate and maintain subsurface .irrigation :practical Visiting a smart ,irrigation project learning how it operates, and receiving training on .it	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A2, B2 / The student should be able to identify the sources of dust storms and explain their impact on agricultural production.	:theoretical Smart irrigation ,method: Installation operation and maintenance of this .method :practical Discussion of student .reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A2, B2 / The student should be able to explain the relationship between gas movement and erosion, and understand the basic concepts of the course.	:theoretical Installation and operation of a drip irrigation system, self-operated practical: Films and slides about wind erosion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
359. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
360. Learning and teaching resources					
Required textbooks curriculum) books, (available	if				
Main references (sources)					
Recommended books and references scientific) journals and (...reports					
Electronic references and websites					

Course description template

74.:Course name	
Wind erosion prediction models	
75. Course code:	
DES404	
76. semester / year	
Fourth semester	
77. Date of preparation of description	
2024/9/1	
78. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
79. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
80.Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Omar Younis Hassan	
:e-mail Mti.lec224.omar@ntu.edu.iq	
81. Course objectives	
Goals	1. To provide students with a basic understanding of the concepts of wind erosion and its impact on ecological and agricultural systems. 2. To enable students to understand the theoretical and mathematical foundations of wind erosion prediction models. 3. Training students to use numerical and computer models to estimate wind erosion rates. 4. Developing skills in analyzing climatic and surface data and linking them to wind erosion phenomena.
82.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

6. .Assigning teamwork to reveal leadership skills

83. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	Knowledge and Application	Introduction: The / concept of erosion / Types of erosion Wind erosion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	Knowledge and Application	Factors affecting wind erosion Climate -1: / Wind Rain / Temperature Land -2uses -3Topography -4Soil characteristics	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	Knowledge and Application	Types of wind erosion 1- Atomization 2- Abrasion 3- Collapse Avalanching	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
				:My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	Knowledge and Application	Wind erosion mechanics -1 Soil loosening and disintegration Initiation -2 of soil movement -3 Transportation -4 Deposition	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	Knowledge and Application	Types of soil movement by wind Suspended -1 load Jumping -2 Saltation Surface -3 Creep	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	Knowledge and Application	Hazard of wind erosion Tolerance / limit of wind erosion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Seventh	2 Theory 3 practical	Knowledge and Application	Main attempts to protect soil from wind erosion / Basic principles of wind erosion control	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	Knowledge and Application	Wind erosion control methods– mechanical methods Tillage/ No- tillage system / Emergency tillage/ Mechanical barriers The most important deciduous fruit trees - in Iraq - Importance Propagation methods Varieties - Essential - care practices	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	Knowledge and Application	Wind erosion control methods– chemical methods Mulches/ Natural and / Synthetic Mulches Oils and Petroleum Products	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
tenth	2 Theory 3 practical	Knowledge and Application	Wind erosion control methods– chemical methods Mulches/ Natural and / Synthetic Mulches Oils and Petroleum Products The most important winter vegetables in Iraq	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	Knowledge and Application	Sand dunes Methods / of sand dune – stabilization chemical and biological methods	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	Knowledge and Application	Economic and social effectsof wind erosion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
thirteenth	2 Theory 3 practical	Knowledge and Application	Gas movement in the soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	Knowledge and Application	Dust storms: their sources and agricultural effects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	Knowledge and Application	Introduction: The / concept of erosion / Types of erosion Wind erosion	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

84. Course evaluation	
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
85.Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

361. :Course name	
Fluid motion modeling	
362. Course code:	
DES405	
363. semester / year	
First semester	
364. Date of preparation of description	
2024/9/1	
365. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
366. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
367. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub :e-mail Samir.f.ayoub@ntu.edu.iq	
368. Course objectives	
Goals	1. To provide students with theoretical and practical knowledge about the basic principles of fluid motion and behavior under different conditions. 2. Enabling students to use mathematical and computational modeling methods to understand and analyze fluid dynamics. 3. Developing students' abilities to link physical concepts with the mathematical laws used in modeling and simulation. 4. Preparing the student to use modern simulation software in the field of fluid mechanics(such as: ANSYS Fluent, OpenFOAM)
369. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
370. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1/ The student should be able to define fluid modeling and explain its importance in engineering .applications	:theoretical Introduction to Fluid Mechanics and the Importance of Modeling :practical Review of simple software examples for fluid modeling	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, A2/ The student should be able to formulate conservation equations for fluids	:theoretical Equations of ,conservation of mass momentum and energy :practical Solving simplified problems using the continuity equation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, A2/ The student should be able to explain the Navier - Stokes equations and apply them to .simple problems	:theoretical - NavierStokes equations :practical Writing code to solve a one-dimensional flow equation	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
				:My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1, A2/ The student should be able to distinguish between ideal and viscous fluids	:theoretical Mathematical modeling of ideal and viscous fluids :practical Simulating non- viscous flow using CFD software	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, A2/ The student should be able to identify the limiting and initial conditions in numerical .models	:theoretical Limit and initial conditions in fluid mechanics :practical Introducing limit conditions into a software model	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, A2/ The student should be able to use finite differences in solving fluid mechanics problems	:theoretical :Numerical methods Finite differences :practical A practical application for solving a simple equation using the	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

			finite differences method	:My work Assigning tasks and reporting	
Seventh	2 Theory 3 practical	A1, A2/ The student should be able to interpret and use the finite-size method	:theoretical :Numerical methods Finite elements :practical Exercise using FEM software to simulate flow	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1, A2/ The student should be able to assess the stability of the numerical solution and reduce errors	:theoretical :Numerical methods Finite Volume :practical Experiment solving a flow equation using FVM	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1, A2/ The student should be able to assess the stability of the numerical solution and reduce errors	:theoretical Numerical stability and error reduction :practical Testing the stability of a model using different time steps	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
tenth	2 Theory 3 practical	A1, A2/ The student should be able to build a CFD model for a simple problem	:theoretical Computer Simulation (CFD) – General Principles :practical Implementing a CFD model using open-source software	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, A2/ The student should be able to model turbulent flow	:theoretical Turbulent Flow Modeling :practical Simulation using the k- ϵ or k- ω model	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, A2/ The student should be able to analyze heat and mass transfer	:theoretical Heat and mass transfer in fluids :practical Simulating heat transfer in a tube or fluid	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
thirteenth	2 Theory 3 practical	A1, A2/ The student should be able to apply fluid modeling to environmental and engineering problems	:theoretical Environmental and engineering applications (rivers pollution, wind) :practical Case study using a numerical model	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, A2/ The student should be able to discuss recent developments in fluid modeling	:theoretical Modern trends ,artificial intelligence) (hybrid models :practical Review of a recent simulation or research	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A1, A2/ The student should be able to integrate theoretical and practical knowledge to prepare a comprehensive model of fluid motion	:theoretical General review Student project discussion – Final exam :practical Presenting practical projects and reports	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
371. Course evaluation					

Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams	
372. Learning and teaching resources	
Required textbooks curriculum) books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

86.:Course name	
Plants of arid regions	
87. Course code:	
DES406	
88. semester / year	
89. Date of preparation of description	
2024/9/1	
90. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
91. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
92.Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Fares Faisal Abdulghani :e-mail	
93. Course objectives	
Goals	1. It explains the environmental and climatic characteristics that distinguish arid and semi-arid regions. 2. Explain the morphological and physiological adaptations of arid region plants to resist environmental stresses such as drought, heat, and salinity. 3. It distinguishes between native and invasive plant species in arid environments. 4. It analyzes the environmental and economic importance of arid region plants in sustainable development. 5. He applies scientific methods in the cultivation and propagation of plants suitable for dry conditions. 6. It assesses the role of arid region plants in combating desertification and maintaining ecological balance.
94.Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion

		5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
95. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1, B2 / The student should be able to define arid plant species and explain their environmental and agricultural importance	Introduction to arid – plant species ,definition ,importance distribution	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A1, B2 / The student should be able to describe the characteristics of the desert environment and its effect on plant growth	Characteristics of the desert environment and its impact on plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A1, B2 / The student should be able to explain the physiological adaptations of desert plants	Physiological adaptations of plants to drought	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A1, B2 / The student should be able to describe the anatomical adaptations of plants	Anatomical adaptations of desert plants	:Theoretical Auditory :methods the method of writing on the	Short ,quizzes homework ,assignments discussions

				board, the method of direct dialogue	
Fifth	2 Theory	A1, B2 / The student should be able to classify arid plant species and identify economically important types	Classification of arid plant species and the most important economic species	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A1, B2 / The student should be able to identify the plant life cycle and its impact on farming strategies	Life cycle of desert ,plants: perennial annual, seasonal	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1, B2 / The student should be able to relate soil properties to the growth of desert plants	Soil and nutrients and their effect on the growth of plants in arid regions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A1, B2 / The student should be able to manage water resources for plants in arid regions	Water and irrigation in arid regions	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
Ninth	2 Theory	A1, B2 / The student should be able to apply appropriate propagation methods for desert plants	Reproduction and propagation in arid plant species	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A1, B2 / The student should be able to assess the ability of plants to resist salinity	Salt-tolerant plants and the effect of salt on plant growth	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B2 / The student should be able to apply plant-based methods to conserve soil and combat desertification	Using plants to combat desertification and preserve soil	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	A1, B2 / The student should be able to identify medicinal and aromatic plants and their uses	Medicinal and aromatic plants in arid regions	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

thirteenth	2 Theory	A1, B2 / The student should be able to explain the impact of climate change on desert plants	Environmental challenges and the impact of climate change on arid plant life	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory	A1, B2 / The student should be able to develop sustainable use strategies for desert plants	Sustainable use of arid plant species in agriculture and the environment	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory				
96. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
97.Learning and teaching resources					
Required textbooks curriculum) books, if (available					
Main references (sources)		,Occupational Safety and Health” by Dr. Nasser Al-Daghmi“ .Al-Yazouri Publishing and Distribution House, 2016			
Recommended books and references scientific)		General Occupational Safety" by Khaled Fathi Madi and" Ahmed Ragheb Al-Khatib, Dar Kunooz Al-Ma'rifah Al-Ilmiyah, 2011			

journals and (...reports	
Electronic references and websites	National Occupational Safety and Health File - Republic of Iraq(2022) International Labour Organization (ilo.org)



Course description template

98.:Course name	
Occupational safety	
99. Course code:	
TAMO451	
100. semester / year	
101. Date of preparation of description	
2024/9/1	
102. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
103. Number of credit hours (total) / Number of units (total)	
hours (2 hours of theory)* 15 weeks 30	
104. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Ahmed Fares Salem :e-mail ahmedalsawaf@ntu.edu.iq	
105. Course objectives	
Goals	1. Introducing students to the concepts of occupational safety ,and health and their importance in protecting people property and the environment. 2. ,Identifying the types of hazards (electrical, mechanical chemical, physical, biological...) and methods of preventing them. 3. To provide students with knowledge of local and international regulations and laws related to occupational safety and health.
106. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills

107. Course structure

Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1/ The student should be able to define occupational safety and explain its importance in the agricultural sector.	The concept of occupational safety	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the second	2 Theory	A1/ The student should be able to identify the laws and regulations governing occupational safety in agriculture.	,Regulations, laws and legislation	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
the third	2 Theory	A1/ The student should be able to identify and classify the different hazards in the agricultural environment.	Identifying agricultural risks	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory	A1/ The student must be able to protect himself and others from physical hazards.	Safety from physical hazards	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

				direct dialogue	
Fifth	2 Theory	A1/ The student should be able to prevent biological hazards on farms.	Safety from biological hazards	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory	A1/ The student must be able to ,handle pesticides fertilizers and chemicals safely.	Safety from chemical hazards	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A1/ The student must be able to protect against mechanical hazards associated with agricultural machinery.	Safety from mechanical hazards	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory	A1/ The student should be able to prevent common diseases in the agricultural sector .	Safety from common diseases	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

Ninth	2 Theory	A1/ The student must be able to use agricultural machinery and equipment safely.	Handling agricultural machinery	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A1/ The student should be able to link occupational safety with the economic improvement of agricultural establishments.	Foundations of Economic Development	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1/ The student should be able to manage agricultural waste in a safe and environmentally friendly way.	Handling agricultural waste	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory	A2/ The student should be able to assess the causes of agricultural accidents and take preventive measures.	Accidents and injuries in the agricultural sector	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
thirteenth	2 Theory	A2/ The student must be able to	Accident reporting procedures	:Theoretical Auditory	Short ,quizzes

		follow the correct procedures for reporting accidents.		:methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	homework ,assignments discussions
fourteenth	2 Theory	A2/ The student must be able to provide first aid in emergency situations.	first aid	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory	A2/ The student should be able to apply safety rules when using pesticides and fertilizers in a practical and safe manner.	Safe use of pesticides and fertilizers	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions
108. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
109. Learning and teaching resources					
Required textbooks curriculum) books, (available		if			

Main references (sources)	,Occupational Safety and Health” by Dr. Nasser Al-Daghmi“ .Al-Yazouri Publishing and Distribution House, 2016
Recommended books and references scientific journals and (...reports)	General Occupational Safety" by Khaled Fathi Madi and" Ahmed Ragheb Al-Khatib, Dar Kunooz Al-Ma'rifah Al-Ilmiyah, 2011
Electronic references and websites	National Occupational Safety and Health File - Republic of Iraq(2022) International Labour Organization (ilo.org)



Course description template

110. :Course name	
Dryland facilities	
111. Course code:	
DES451	
112. semester / year	
Fourth semester	
113. Date of preparation of description	
2024/9/1	
114. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities	
115. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
116. Name of the course coordinator (list all names, if there is more than one)	
the name: Dr. Fares Faisal Abdul Ghani :e-mail faris.faisal.701@ntu.edu.iq	
117. Course objectives	
Goals	1. Introducing students to the characteristics of arid and semi-arid regions in terms of climate, soil, water resources, and agricultural challenges. 2. To provide students with knowledge of the fundamentals of designing agricultural and hydraulic structures suitable for harsh environmental conditions. 3. Developing students' abilities to plan and manage water resources (dams, reservoirs, irrigation networks) in a way that ensures sustainability. 4. To train students to deal with the problems of erosion, soil erosion, and desertification, and to propose appropriate engineering solutions.
118. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
119. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define arid region facilities and explain their importance	:theoretical Introduction to Arid – Region Facilities Definition and Importance :practical Visit a laboratory/station to see examples of facilities	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1/ The student should be able to distinguish between types of facilities and describe their functions.	:theoretical :Types of structures reservoirs, small dams, water collection basins :practical Drawing simplified plans for various facilities	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B1 / The student should be able to apply the fundamentals of engineering design for small hydraulic structures	:theoretical Fundamentals of small dam and reservoir design :practical Exercise in the dimensional design of	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

			a small basin or experimental dam	direct dialogue :My work Assigning tasks and reporting	
Fourth	2 Theory 3 practical	A1, B1 / The student should be able to describe surface water harvesting systems and evaluate their effectiveness	:theoretical The student should be able to describe surface water harvesting systems and evaluate their effectiveness :practical Field visit to a rainwater harvesting site	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A1, B1 / The student should be able to implement soil erosion prevention techniques and assess their impact	:theoretical Improving soil and preventing erosion in arid regions :practical Experience in applying soil barriers or earthen terraces	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A1, B1 / The student must be able to apply desertification control and land reclamation techniques	:theoretical Desertification control and dryland reclamation techniques :practical Growing soil-stabilizing plants in an experimental field	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Seventh	2 Theory 3 practical	A1, B1 / The student should be able to design and implement irrigation networks suitable for desert conditions	:theoretical Design of drip irrigation networks and trenches in arid regions :practical Installing and testing a small irrigation network model	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Eighth	2 Theory 3 practical	A1/ The student should be able to assess and manage groundwater and surface water resources	:theoretical Groundwater and surface water management :practical Measuring water levels and monitoring quality	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A1/ The student should be able to apply techniques for protecting land from floods and torrents	:theoretical Flood and flash flood control facilities in arid regions :practical Design a simple model for a drainage channel or barrier to prevent flooding	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
tenth	2 Theory 3 practical	A1, B1 / The student should be able to conduct an economic evaluation of establishments	:theoretical Economic analysis of establishments and cost-benefit balancing :practical Calculating the cost of setting up a simple facility and its potential returns	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
eleven th	2 Theory 3 practical	A1, B1 / The student must be able to develop and implement a maintenance plan for the facilities	:theoretical Maintenance and follow-up of water facilities :practical Developing a periodic maintenance plan for a pilot site	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A1, B1 / The student must be able to use modern technology to monitor and manage facilities	:theoretical Using modern technology(GIS – Remote Sensing) in the design and monitoring of facilities :practical Exercise onGIS software to monitor and track the location of a facility	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
thirteenth	2 Theory 3 practical	A1/ The student should be able to analyze environmental impacts and plan for risk management	:theoretical Environmental impact of facilities and risk management :practical Case study for assessing the environmental impact of an existing facility	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A1, B1 / The student should be able to propose future solutions for managing facilities under changing climatic conditions	:theoretical Future models for facility management in the context of climate change :practical Developing simulation scenarios using climate data	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	exam			
120. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
121. Learning and teaching resources					
Required textbooks curriculum)					

books, if (available	
Main references (sources)	
Recommended books and references scientific) journals and (...reports	
Electronic references and websites	



Course description template

373. :Course name					
Conservation agriculture					
374. Course code:					
DES452					
375. semester / year					
376. Date of preparation of description					
2024/9/1					
377. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
378. Number of credit hours (total) / Number of units (total)					
hours (2 theory + 3 practical)* 15 weeks 75					
379. Name of the course coordinator (list all names, if there is more than one)					
the name: Dr. Mohamed Salem Ahmed					
:e-mail mohameedsa66@ntu.edu.iq					
380. Course objectives					
Goals					
381. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
382. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A2, B2 / The student should be able to define conservation agriculture and	:theoretical Introduction to Conservation – Agriculture ,Definition	:Theoretical Auditory :methods the method of writing on the	Short ,quizzes homework ,assignments discussions

		explain its importance.	Importance, Basic Principles. :practical Discussion of local examples of farms using conservation agriculture.	board, the method of direct dialogue :My work Assigning tasks and reporting	
the second	2 Theory 3 practical	A1/ The student should be able to explain the reasons for soil degradation resulting from traditional practices.	:theoretical Traditional soil problems and the reasons for its degradation. :practical Analysis of field soil properties and the effect of traditional tillage.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A1, B1 / The student should be able to explain the basic principles of conservation agriculture and apply them theoretically.	:theoretical The three principles of conservation ,agriculture: no-till mulch, and diversity. :practical A demonstration of vegetation cover on a small field.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory 3 practical	A2/ The student should be able to manage agricultural waste effectively in conservation agriculture systems.	:theoretical Agricultural waste management in conservation agriculture. :practical	:Theoretical Auditory :methods the method of writing on the board, the method of	Short ,quizzes homework ,assignments discussions

			Collecting and analyzing plant waste for reuse as mulch or organic fertilizer.	direct dialogue :My work Assigning tasks and reporting	
Fifth	2 Theory 3 practical	A2, B2 / The student should be able to select and apply the appropriate plant cover.	:theoretical :Vegetation cover ,types, benefits techniques. :practical Growing cover plants in an experimental field.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A2/ The student should be able to implement limited tillage techniques and analyze their effects on the soil.	:theoretical Reducing tillage and its effect on soil and water. :practical Using limited tillage tools to compare their effect on the soil.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory 3 practical	A2/ The student should be able to develop a plan for soil and nutrient management in conservation agriculture systems.	:theoretical Soil and nutrient management in conservation agriculture. :practical Using limited tillage tools to compare their effect on the soil.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
Eighth	2 Theory 3 practical	A2/ The student should be able to apply effective water management in conservation fields.	:theoretical Water management in conservation agriculture :practical Experiment with irrigation systems suitable for conservation agriculture.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A2/ The student should be able to implement weed and pest control strategies within conservation agriculture systems.	:theoretical Weed and pest control in conservation agriculture systems. :practical Applying weed control techniques in a pilot field.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory 3 practical	A2, B2 / The student should be able to plan and implement sustainable crop cycles.	:theoretical Agricultural diversity and the importance of rotations in conservation agriculture. :practical Designing a crop rotation schedule for an experimental field.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				:My work Assigning tasks and reporting	
eleven th	2 Theory 3 practical	A2, B2 / The student should be able to evaluate the economic feasibility of conservation agriculture.	:theoretical Evaluating the economic performance of conservation agriculture. :practical Calculating the costs and returns of an experimental field using conservation agriculture.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A2, B2 / The student should be able to link conservation agriculture practices to climate change.	:theoretical Adapting to climate change through conservation agriculture. :practical Analyzing climate data and linking it to conservation agriculture applications.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
thirteen th	2 Theory 3 practical	A2, B2 / The student should be able to apply conservation agriculture in arid environments.	:theoretical Conservation agriculture in desert and arid environments :practical Case study of a desert farm using conservation agriculture.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning	Short ,quizzes homework ,assignments discussions

				tasks and reporting	
fourteenth	2 Theory 3 practical	A2, B2 / The student should be able to use modern technologies to support conservation agriculture.	:theoretical Modern technologies in conservation agriculture(GIS – Precision Agriculture). :practical UsingGIS software to plan and manage a pilot field.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A2, B2 / The student should be able to integrate their theoretical and practical knowledge to apply conservation agriculture systems effectively and sustainably.	Discussion of project reports – final exam.	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
383. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
384. Learning and teaching resources					
Required textbooks curriculum) books, if (available					
Main references (sources)		Dry farming, its foundations, elements and investment / Dr. Abdullah Qasim			
Recommended books and					

references scientific) journals and (...reports	
Electronic references and websites	



Course description template

1. :Course name					
dryland pastures					
2. Course code:					
DES453					
3. semester / year					
Fourth semester					
4. Date of preparation of description					
2024/9/1					
5. Available forms of attendance					
1. Weekly lesson schedule (theory) My work .(2. Discussions, scientific seminars, and other extracurricular activities					
6. Number of credit hours (total) / Number of units (total)					
hours (2 theory + 3 practical)* 15 weeks 75					
7. Name of the course coordinator (list all names, if there is more than one)					
the name: M.M. Omar Ahmed Fathi :e-mail omar.ah.f@ntu.edu.iq					
8. Course objectives					
Goals		Defining the importance of natural pastures, methods of evaluating pasture vegetation, methods of caring for and improving natural and artificial pastures, the most important grazing plants and ways to preserve them, and focusing on the .most promising grazing plants in arid regions			
9. Teaching and learning strategies					
strategy		1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting 6. .Assigning teamwork to reveal leadership skills			
10. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory	A1/ The student should be able to	:theoretical	:Theoretical Auditory	Short ,quizzes

	3 practical	define pastures and their types and explain their economic importance.	,Pastures: Definition Types, Economic Importance of Natural Pastures, Areas Pastoral , productive Botanicals pastoral For lands Pastures :practical A field visit to local pastures to learn about plant diversity	:methods the method of writing on the board, the method of direct dialogue :practical Assigning tasks and reporting	homework ,assignments discussions
the second	2 Theory 3 practical	A1/ The student should be able to estimate plant and pastoral productivity practically and theoretically.	Features Home For pastures natural in homeland Arabic environments Botanicals The Great in homeland The Arab method used in exploiting natural .pastures in the desert :practical Collecting data on the productivity of rangeland plants on site	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the third	2 Theory 3 practical	A2/ The student should be able to describe the environmental features of natural pastures and classify plant environments.	:theoretical Problems and difficulties facing natural pastures in Iraq, factors Related In activities Humanity factors , Related In activities Agricultural factors Related Through practices Pastoral factors Related Ownership the earth and policies Laws , factors Related institutionally :practical Drawing illustrative environmental maps of plant areas	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Fourth	2 Theory 3 practical	A2/ The student should be able to analyze the different methods of exploiting pastures.	:theoretical Qualitative aspects of natural pasture plants (natural vegetation) and its distribution in pasture types, natural vegetation in the desert such as annual plants, perennial trees (and perennial shrubs) :practical A case study on grazing patterns in the steppes	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fifth	2 Theory 3 practical	A2, B2 / The student should be able to analyze the problems related to natural pastures and their factors.	:theoretical Patterns pastoral and its impact on plants Pastures deterioration Lands Pastures natural in homeland The Arab world has deteriorated Lands Pastures natural :practical Identifying problems on maps or satellite images	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth	2 Theory 3 practical	A2, B2 / The student should be able to assess the impact of human and agricultural activities on pastoral lands.	:theoretical Factors Influential in deterioration Lands pastoral indicators deterioration Lands Pastures natural :practical Collecting field data on human activities and their impact on rangelands	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Seventh	2 Theory	A2, B2 / The student should be	:theoretical	:Theoretical Auditory	Short ,quizzes

	3 practical	able to identify and classify grazing plants according to species and plant type.	The foundations of quantitative assessment of pasture vegetation, key indicators in determining pasture ,productivity Quantitative attributes , or measures sampling methods :practical Plant sampling and diversity analysis	:methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	homework ,assignments discussions
Eighth	2 Theory 3 practical	A2, B2 / The student should be able to analyze the impact of different grazing patterns on plant diversity and productivity.	:theoretical plants pastoral Evaluation Its importance Relativity in homeland , Arabic standards Importance Relativity For plants Pastoral , standard Environmental standard Nutritional standard The suitability yield :practical Studying the effect of intensive grazing on plants	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Ninth	2 Theory 3 practical	A2, B2 / The student should be ,able to identify reflect, and quantify indicators of rangeland degradation.	:theoretical look around Activities qualification Pastures deteriorating And the material The plant used The most important plants pastoral Promising trees Pasture , shrubs , Pastoral , grasses herbs pastoral :practical Assessing deterioration at a specific site, using quantitative indicators	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth	2 Theory	A2, B2 / The student should be	:theoretical	:Theoretical Auditory	Short ,quizzes

	3 practical	able to apply the principles of quantitative assessment and sampling methods to estimate pasture productivity.	perceptions Future For development and development Resources pastoral to update and activation Policies and legislation The archer For development Sustainable rangelands :practical Pasture data collection and sample analysis	:methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	homework ,assignments discussions
eleven th	2 Theory 3 practical	A2, B2 / a The student should be able to assess the relative importance of grazing plants according to scientific standards.	:theoretical situation Implementation Strategies and plans a job suitable For development Pastoral , resources strengthening Frameworks Institutional The relationship By qualifying and management Pastoral , resources dependency approach The partnership in development and management Resources pastoral :practical Classification of grazing plants according to different criteria	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
twelfth	2 Theory 3 practical	A2, B2 / The student should be able to prepare and implement plans for rehabilitating degraded pastures and selecting appropriate plants .	:theoretical building Abilities Artistic To qualify and management Resources , Pastoral encouraging Research and studies in area Resources , Pastoral implementation The bundle Artistic	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

			Promising on range wide :practical Designing a field plan for the rehabilitation of a degraded pasture	:My work Assigning tasks and reporting	
thirteenth	2 Theory 3 practical	A2, B2 / The student should be able to analyze policies and submit proposals for the development and growth of pastoral resources.	:theoretical Units pastoral Home and integration Among them , pastures Wormwood , pastures Allies , pastures Shenan , pastures Lands , Salt flats pastures Lands sandy :practical Discussion of rangeland development and natural resource development projects	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fourteenth	2 Theory 3 practical	A2, B2 / The student should be able to develop strategies and action plans for developing pastoral resources and managing research projects.	:theoretical Methods for the care and improvement of ,natural pastures revitalization of degraded grazing areas, and utilization of available water .resources :practical Preparing research project proposals for rangeland development	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :My work Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
fifteenth	2 Theory 3 practical	A2, B2 / The student should be able to practically apply methods for improving natural pastures and managing water resources.	:theoretical ,Pastures: Definition Types, Economic Importance of Natural Pastures, Areas Pastoral , productive Botanicals pastoral For lands Pastures :practical Field visit to different pastures, application	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

			of pasture improvement methods	:My work Assigning tasks and reporting	
11. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
12.Learning and teaching resources					
Required textbooks curriculum) books, if (available					
Main references (sources)					
Recommended books and references scientific) journals and (...reports					
Electronic references and websites					

Course description template

1. :Course name	
(Geographic Information SystemsGIS)	
2. Course code:	
DES455	
3. semester / year	
4. Date of preparation of description	
2024/9/1	
5. Available forms of attendance	
1. Weekly lesson schedule (theory) My work .(	
2. Discussions, scientific seminars, and other extracurricular activities	
6. Number of credit hours (total) / Number of units (total)	
hours (2 theory + 3 practical)* 15 weeks 75	
7. Name of the course coordinator (list all names, if there is more than one)	
the name: M.M. Samir Farhan Ayoub	
:e-mail Samir.f.ayoub@ntu.edu.iq	
8. Course objectives	
Goals	1. Introducing students to the concept of Geographic Information Systems and its basic components (software, hardware, data, human resources). 2. To equip students with the basic skills in dealing with ,spatial and descriptive data in terms of collection, input storage, processing and analysis. 3. Developing students' ability to use spatial analysis tools in studying environmental, agricultural, urban, and natural resource problems. 4. Introducing students to Geographic Information Systems (GIS) technologies and their diverse ,applications in urban planning, resource management environmental studies, and precision agriculture.
9. Teaching and learning strategies	
strategy	1. .Interactive lectures 2. .Brainstorming 3. .Practical laboratory and field training 4. .Dialogue and discussion 5. .Assigning tasks and reporting

		6. .Assigning teamwork to reveal leadership skills			
10. Course structure					
Week	Hours	Required learning outcomes	Unit/Topic Name	Teaching method	Evaluation Method
the first	2 Theory 3 practical	A1, B1 / The student should be able to define Geographic Information Systems (GIS) explain its components, and useArcGIS software.	:theoretical Definition of Geographic Information Systems (GIS), a historical overview of the emergence of GIS, the concept of categories in GIS, components of GIS (computer systems, GIS software, spatial and descriptive data and ,information, users data management and .(spatial analysis :practical Defining the - Geographic Information System (GIS) and installing - .the software Familiarizing yourself with the interface of " theARC GIS 9.3 " .software “ArcCatalog “ ,”Arc Map “ and ,”Arc Toolbox .” The types of data - that the program .handles	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
the second	2 Theory 3 practical	A1, B1 / The student should be able to link geographic information systems with other sciences and	:theoretical The relationship of - the Geographic Information System to other sciences (remote ,sensing, cartography	:Theoretical Auditory :methods the method of writing on the board, the	Short ,quizzes homework ,assignments discussions

		apply coordinate correction to the map.	,statistics, geography .computer science) :practical Selecting the appropriate location ,for the map determining the coordinates, and correcting and modifying the map image using four reference points with known coordinates on .the map	method of direct dialogue :Practical Assigning tasks and reporting	
the third	2 Theory 3 practical	A1, C1/ The student should be able to use Geographic Information Systems to create shape files and apply cartographic representation rules.	:theoretical The functions of Geographic Information Systems (GIS) include data ,collection, storage ,querying, analysis .and output :practical "Create a "shape file of the features that represent the map's aspects, adhering to the rules and principles of cartographic representation. Define :the map elements points, lines, and .polygons	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Fourth	2 Theory 3 practical	B1 , C1/ The student should be able to describe the benefits of using Geographic Information Systems and to deal with the basic tools in the program.	:theoretical Benefits of using Geographic .Information Systems :practical Working with the - "Tools" toolbar . Dealing with the - standard toolbar	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue	Short ,quizzes homework ,assignments discussions

				Practical Assigning tasks and reporting	
Fifth	2 Theory 3 practical	A1, B1 / The student should be able to link different technologies to GIS programs and apply the technical tools in the program.	:theoretical Technologies related to Geographic Information Systems (GIS) (remote sensing, geodesy surveying, building science, and cartography). Advantages of GIS software. :practical Working with the - "Tools" toolbar . Dealing with the - standard toolbar	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
Sixth + Seventh	2 Theory practical	A1, C1/ The student should be able to represent and synthesize spatial data using advanced tools in ArcGIS. B1 , C1/ The student should be able to classify data sources and their characteristics and apply them in the program.	:theoretical Data synthesis and representation methods in Geographic Information Systems (GIS) (spatial data components, data synthesis in GIS "linear "vector structures, including points, lines, and "polygons), area "grid structures, and triangular grid model construction. Irregular "TIN ,tables " .metadata tables :practical Working with the - .editor's toolbar Drawing tools in the - "Drawing Tool" menu and "Edit" menu commands in the .display area	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

Eighth Ninth	2 Theory practical	B1 , C1/ The student should be able to input spatial data and create different feature layers. B1 , C1/ The student should be able to manage process and analyze metadata.	:theoretical Types of data in Geographic Information Systems (GIS) (spatial, non-spatial, temporal .(dynamic spatial Linear data sources - ”vector data sources Survey data sources - ”point data sources Primary sources - Secondary sources - , (maps of all kinds ,aerial photographs satellite data and visuals, Global ,Positioning System digital elevation .model) Non-spatial data sources :practical Working with the - .”Effect” toolbar Types of fonts and .colors of features Advanced Editing - toolbar	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions
tenth + eleven th	2 Theory practical	B1 , C1/ The student should be able to perform spatial analysis of linear data and apply topological matching. A1, B1 / The student should be able to useDEM to produce multiple analytical maps and analyze terrain.	:theoretical Entering spatial data into the computer (the concept of the process of entering spatial and ,descriptive data spatial data evaluation criteria, and methods of entering spatial data into the computer using a manual and) “ automaticDigitizer device and their ” , (features The coordinate - .system	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

			Classification of - .map projections Determining the - ,coordinates ,correcting the map and selecting the map .location Steps to represent - the features of the corrected map using “theARC GIS ” .program Create layers for the - features that make up .the map Representation of - point, line, and area features of map .features :practical Preparing the map for printing and working "with the "Layout toolbar tools ”Tools on the “Insert - ribbon for inserting .map elements		
twelfth + thirteenth	2 Theory practical	A1, B1 / The student should be able to produce and spatially analyze infrastructure network maps. A1, B1 / The student should be able to integrate spatial data and analyze the spatial results of GIS projects.	:theoretical Data tables, inputting metadata related to spatial point, line and . cadastral data Data processing selecting features) ,using spreadsheets selecting features based on their position among other features, selecting features using a "shape, the "Statistics dialog box, and the Summary" dialog" (box :practical	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

			Data tables, inputting metadata related to spatial point, line and . cadastral data Data processing (selecting features) ,using spreadsheets selecting features based on their position among other features, selecting features using a "shape, the "Statistics dialog box, and the Summary" dialog" (box		
fourteenth + fifteenth	2 Theory practical	A1, B1 / The student should be able to prepare maps for final output and include the necessary elements. B1 , C1/ The student should be able to integrate all the acquired skills into a comprehensive appliedGIS project .	:theoretical Spatial analysis of data in Geographic ,Information Systems spatial analysis of linear data (topological matching) and its types, spatial analysis in the surveying system (cellular), Digital “ Elevation Model DEM regular and ,” irregular network ,structure extrapolation of data from the Digital “ Elevation Model DEM map ,” derivation: contour ,maps, flange maps ,hill shading maps slope maps, field of view, elevation sections, production of sewer network .maps :practical Spatial analysis of data in Geographic	:Theoretical Auditory :methods the method of writing on the board, the method of direct dialogue :Practical Assigning tasks and reporting	Short ,quizzes homework ,assignments discussions

			,Information Systems spatial analysis of linear data topological matching) and its types, spatial analysis in the surveying system (cellular), Digital “ Elevation Model DEM regular and ,” irregular network ,structure extrapolation of data from the Digital “ Elevation Model DEM map ,” derivation: contour ,maps, flange maps ,hill shading maps slope maps, field of view, elevation sections, production of sewer network .maps		
11. Course evaluation					
Oral tests/ Written tests/ Weekly reports/ Daily attendance/ Participation and)) ((interaction in lectures/ Midterm and final exams					
12.Learning and teaching resources					
Required textbooks ,curriculum books) (if available		Lectures according to the prescribed curriculum			
Main references (sources)		Microsoft Access 2010			
Recommended books and references (scientific journals and (...reports					
Electronic references and websites					