MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Biochemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**TAMO 201**				
ECTS Credits	**5**				
SWL (hr/sem)	**75**				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	Hala awf abdalrahman		**e-mail**	**Hala chilmeran 20@gmail .com**	
Module Leader's Acad. Title		**Lecture**	**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**01/06/2021**	**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Anatical Chemistry**	**Semester**	**Second**
Co-requisites module	**Organig Chemistry**	**Semester**	**Second**

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

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل75 ساعة			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	65	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غترالمنتظم للطالب خلال الفصل	10	**Unstructured SWL (h/w)** الحمل الدراسي غترالمنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**60**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

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

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**الكيمياء الحياتية** **د.طارق يونس احمد ولؤي عبد علي الهلالي2012**	Yes
Recommended Texts	**bioChemistry,2020**	No
Websites	http://ocw.mit.edu/courses/biology/7-013-introductory-biology-spring-2013/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Wind erosion and its preventive methods**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES301**				
ECTS Credits	5				
SWL (hr/sem)	75				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**		
Module Tutor	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**01/04/2024**	**Version Number**	**1.0**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introducing the student to the concept of wind erosion, its types, mechanics, types of wind, methods, techniques, foundations of resistance, and its environmental and economic risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	G- Cognitive objectives The ability to identify the elements of wind erosion in dry areas. Identify methods of wind erosion and how to combat it in dry areas Study of plants and their relationship to the ecosystem and climate elements in dry areas Identify plant succession, Iraq's climatic zones, and its environmental types.\\\ Course-specific skills objectives. The ability to discuss in a scientific spirit and express what constitutes a study of the subject. The ability to communicate and inquire with the subject teacher Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.
Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

	أسبوعيا		
6	**Unstructured SWL (h/w)**	91	**Unstructured SWL (h/sem)** الحمل الدراس غترالمنتظم للطالب خلال الفصل

	أسبوعيا		
200			**Total SWL (h/sem)** الحمل الدراس الكلي للطالب خلال الفصل

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction: The concept of erosion / types of erosion / wind erosion
Week 2	Factors affecting wind erosion 1- Climate: wind/rain/temperature 2- Land use 3-Topography 4- Soil characteristics
Week 3	Types of wind erosion: Type of wind erosion 1- Winnowing 2- Itching or abrasion 3-Avalanching
Week 4	Wind erosion mechanics 1- Soil loosing and disintegration 2- The beginning of the movement 3- Transporting 4- Deposition
Week 5	Types of soil movement by wind 1- Suspended load 2- Saltation jumping 3-Creep Surface
Week 6	Hazard of wind erosion / Tolerance limit of wind erosion
Week 7	The main attempts to protect soil from wind erosion / basic principles for controlling wind erosion
Week 8	Wind erosion control -mechanical methods Tillage / No-tillage system / Emergency –tillage / mechanical barriers The most important deciduous fruit trees in Iraq - importance - methods of propagation - varieties - most important service operations
Week 9	Wind erosion control – chemical methods

Week 10	Wind erosion control – chemical methods Mulches / natural and industrial coatings / oils and petroleum derivatives
Week 11	Wind erosion control – chemical methods Mulches / natural and industrial coatings / oils and petroleum derivatives The most important winter vegetables in Iraq
Week 12	Sand dunes / Sand dune stabilization methods - chemical and biological methods
Week 13	Sand dunes / Sand dune stabilization methods - chemical and biological methods
Week 14	Economic and social effect of wind erosion
Week 15	Dust storms-the sources and its agricultural effectiveness
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Slides and movies
Week 2	Applications of the general equation WEE in the field
Week 3	Dry sieving
Week 4	Calculate the dry weighted diameter rate
Week 5	Surface roughness calculations according to tables
Week 6	Climate factor calculations
Week 7	Calculates the length of the unprotected field
Week 8	Calculate plant density
Week 9	Demolition rate calculations
Week 10	Statistical measures: sorting, skewness and kurtosis coefficient
Week 11	Slides and movies
Week 12	Wind tunnel experiments
Week 13	Wind tunnel experiments
Week 14	Field tours
Week 15	Field tours

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	محاضرات حسب المنهج المقرر	
Recommended Texts		
Websites		

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Cultivation of desert lands**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES302**				
ECTS Credits	5				
SWL (hr/sem)	75				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**		
Module Tutor	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**01/04/2024**	**Version Number**	**1.0**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Characteristics and emergency conditions of the soil that directly and indirectly negatively affect soil productivity and which require reclamation, as well as teaching students how to carry out reclamation operations, improve the soil, and conduct experiments and practices in this field.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The applicant must be able to identify the types of soils and methods of reclaiming them
Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

	أسبوعيا		
6	**Unstructured SWL (h/w)**	91	**Unstructured SWL (h/sem)** الحمل الدراس غترالمنتظم للطالب خلال الفصل

	أسبوعيا		
200			**Total SWL (h/sem)** الحمل الدراس الكلي للطالب خلال الفصل

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	The concept of land reclamation and its cycle in agricultural production
Week 2	Reclamation of salt lands
Week 3	Reclamation of salt lands
Week 4	Phytoremediation of soils affected by salts
Week 5	Phytoremediation of soils affected by salts
Week 6	Reclaimed land management
Week 7	Reclaimed land management
Week 8	Sodic land reclamation
Week 9	Sodic land reclamation...Continuation
Week 10	Gypsum land reclamation
Week 11	Desert land reclamation

Week 12	Reclamation of sandy lands
Week 13	Reclamation of limestone lands
Week 14	Reclamation of flooded lands
Week 15	Acid land reclamation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Saline Land Reclamation Program: First Phase
Week 2	Saline Land Reclamation Program: Calculations, including cutting and filling calculations
Week 3	The effect of cutting and backfilling on soil properties
Week 4	Reclamation program: methods of filling contour lines
Week 5	Soil salinity measurements
Week 6	Calculations of washing requirements
Week 7	Reclamation Program: Third Phase/Implementation
Week 8	Reclamation Program: Third Phase/Continuation
Week 9	The fourth stage: implementation
Week 10	Estimation of gypsum content
Week 11	Calculations of the sodium adsorption ratio and the percentage of sodium exchanged to estimate the hazard of sodium
Week 12	Calculation problems about washing requirements and salt balance
Week 13	Determination of calcium carbonate and the behavior of carbonic salts in their aqueous solutions
Week 14	Results of saline land reclamation experiments in Iraq.
Week 15	Land reclamation machines and equipment

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	استصلاح وتسوية التربة / نجيب عبد الحليم هنداوي	
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Harvesting of water**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES303**				
ECTS Credits	3				
SWL (hr/sem)	5				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**	**Master**	
Module Tutor	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introducing the student to the concept of water harvesting, the foundations of water harvesting processes, and methods and techniques of water harvesting. Planning and design of harvest lands, water storage and quality of harvest water.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals Ability to determine water harvesting methods in dry areas. Learn about increasing the effectiveness of water harvesting in dry areas Study of plants and their relationship to the ecosystem and climate elements in dry areas Identifying plant succession, Iraq's climatic zones, and its environmental types. Course-specific skills objectives. The ability to discuss in a scientific spirit and express what constitutes a study of the subject. The ability to communicate and inquire with the subject teacher Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.
Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

	أسبوعيا		
6	**Unstructured SWL (h/w)**	91	**Unstructured SWL (h/sem)** الحمل الدراس غترالمنتظم للطالب خلال الفصل

	أسبوعيا		
200			**Total SWL (h/sem)** الحمل الدراس الكلي للطالب خلال الفصل

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Concept and definition of water harvesting Components of water harvesting systems Importance and benefits of water harvesting
Week 2	**Hydrological aspects of water harvesting** The hydrological cycle Small hydrological watershed model Hydrological characteristics Frequency analysis and design rainfall Rainfall-runoff relationship Factors affecting runoff Soil type Rainfall characteristics Land cover Slope of the micro-catchment Size and shape of the micro-catchment Runoff models suitable for water harvesting Runoff models for micro-catchment water harvesting Runoff models for macro-catchment water harvesting
Week 3	**Methods and techniques in water harvesting** Classifications of water harvesting methods Micro-catchment water harvesting methods Rooftop and courtyard systems Suitable surfaces Issues to be addressed On-farm systems Inter-row water harvesting Negarim Meskat Contour bench terraces Small pits Contour bunds and ridges Semicircular and trapezoidal bunds

	Eyebrow terraces Rectangular bunds Vallerani-type micro-catchments Macro-catchment water harvesting techniques Long-slope water harvesting Hillside conduit systems Limans Large semicircular or trapezoidal bunds Cultivated tanks/reservoirs and hafairs Floodwater harvesting systems Wadi-bed water harvesting systems Off-wadi systems Harvesting water for animal consumption Traditional techniques Modern techniques Contamination concerns
Week 4	**Runoff inducement methods** Methods of improving runoff Creating shallow channels Clearing the catchment Smoothing the soil surface Compacting the soil surface Surface sealing Impermeable coverings Advantages and disadvantages of runoff-inducement methods
Week 5	**Identification of areas suitable for water harvesting** Parameters for identifying suitable areas Rainfall characteristics Hydrology and water resources Vegetation and land use Topography, soil type and soil depth Socioeconomics and infrastructure Methods of data acquisition Overview Ground truthing Aerial photography Satellite and remote-sensing technology Tools
Week 6	**Planning and design of water harvesting systems** Soil–water–plant–climate relations Soil Texture and structure Water-holding capacity and soil depth Infiltration rate Crop water requirements Plant and drought Estimating crop water needs Field water budget Rainfall Inter-seasonal distribution of rainfall Design rainfall Need for storage Basic design procedure Selection of site and method Selection of crops Runoff estimation Catchment: Cropping area ratio (CCR) Design examples Optimization of system design Further considerations in area ratio selection Design considerations for trees

	Design for trees Life-saving harvested water Dimensioning, materials and estimation of quantities Dimensioning and system layout Bund earthwork Earthwork balance
Week 7	**Storage of harvested water** Soil profile Above ground storage Surface/ground storage Small storage ponds Small farm reservoirs Tanks Hafairs Large reservoirs Subsurface/underground storage Cisterns Lining water storage structures Groundwater dams Sand-storage dams Percolation dams Subsurface dams Selection of storage system
Week 8	Concept and definition of water harvesting Components of water harvesting systems Importance and benefits of water harvesting
Week 9	**Hydrological aspects of water harvesting** The hydrological cycle Small hydrological watershed model Hydrological characteristics Frequency analysis and design rainfall Rainfall-runoff relationship Factors affecting runoff Soil type Rainfall characteristics Land cover Slope of the micro-catchment Size and shape of the micro-catchment Runoff models suitable for water harvesting Runoff models for micro-catchment water harvesting Runoff models for macro-catchment water harvesting
Week 10	**Methods and techniques in water harvesting** Classifications of water harvesting methods Micro-catchment water harvesting methods Rooftop and courtyard systems Suitable surfaces Issues to be addressed On-farm systems Inter-row water harvesting Negarim Meskat Contour bench terraces Small pits Contour bunds and ridges Semicircular and trapezoidal bunds Eyebrow terraces Rectangular bunds Vallerani-type micro-catchments Macro-catchment water harvesting techniques Long-slope water harvesting Hillside conduit systems

	Limans Large semicircular or trapezoidal bunds Cultivated tanks/reservoirs and hafairs Floodwater harvesting systems Wadi-bed water harvesting systems Off-wadi systems Harvesting water for animal consumption Traditional techniques Modern techniques Contamination concerns
Week 11	**Runoff inducement methods** Methods of improving runoff Creating shallow channels Clearing the catchment Smoothing the soil surface Compacting the soil surface Surface sealing Impermeable coverings Advantages and disadvantages of runoff-inducement methods
Week 12+13	**Implementation, operation, and maintenance of water harvesting systems** Implementing water harvesting systems Considerations in implementation Over-design and under-design issues Appropriate technology Operating water harvesting systems Maintaining water harvesting systems Monitoring and evaluation Extension and training
Week 14+15	**Socioeconomic issues** Social feasibility studies Land-tenure issues Analyzing costs and benefits of water harvesting Costs in water harvesting Benefits of water harvesting Economic feasibility analysis Micro-catchments for field crops Macro-catchments in sub-Saharan Africa Examples from China and India Some general recommendations Integrated approach to planning and management The role of government agencies Community participation Gender representation Farmers as manager The role of experts and donor agencies Adoption or non-adoption of interventions Water harvesting and sustainability in agriculture Resource sustainability Ecological sustainability Social sustainability Other sustainability aspects Economic sustainability Technological sustainability Political sustainability

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Hydrological graph for catchment area
Week 2	Hydrological charactristics of the area
Week 3	Evapotranspiration precipitations frequency analysis run off computation
Week 4	Run off models for macro and micro catchment
Week 5	Method for water harvesting
Week 6	Method for water harvesting
Week 7	Method to improve run off for catchment area
Week 8	Identification of the catchment area
Week 9	Planning and design of water harvesting system
Week 10	Planning and design of water harvesting system
Week 11	Planning and design of water harvesting system
Week 12	Planning and design of water harvesting system
Week 13	Storage of harvesting water
Week 14	Case study
Week 15	Analysis of cost of water harvesting

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	تقنيات الري الحديثة والري الحقلي	
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Soil conservation**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES304**				
ECTS Credits	4				
SWL (hr/sem)	60				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**	**Master**	
Module Tutor	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching students about the dangers and deterioration to which soil and water are exposed as a result of negligence and poor management, and ways and means of reducing these risks, protecting soil and water from them, and investing them (soil and water) in the correct manner that ensures their sustainability.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals Identify and study • Methods of analyzing surface leakage • Water erosion - its concept - types - mechanics • The relationship of erosion to soil productivity • The general equation for wind erosion Course-specific skills objectives. Teaching students about the dangers and deterioration to which soil and water are exposed as a result of negligence and poor management, and ways and means of reducing these risks, protecting soil and water from them, and investing them (soil and water) in the correct manner that ensures their sustainability.
Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction - The concept of soil and water conservation Introduction
Week 2	Rain - Types of rain - Physical properties of rainPhysics of Rainfall
Week 3	Surface runoff - factors affecting surface runoff
Week 4	Runoff analysis methods
Week 5	Water erosion - its concept - types - mechanics
Week 6	Universal Soil Loss Equation
Week 7	Methods of controlling water erosion
Week 8	The relationship between erosion and soil productivity
Week 9	Wind erosion - its concept - its mechanics
Week 10	The general equation for wind erosion
Week 11	Ways to control wind erosion - Wind Erosion Control
Week 12	Sand dunes and ways to control them Sand Dune

Week 13	The concept of water conservation - methods of water conservation
Week 14	Soil and Water Foundations, permanent and temporary soil and water conservation facilities
Week 15	Soil and water conservation planning
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Rainfall data analysis
Week 2	The logical method for measuring the maximum surface flow rate
Week 3	Direct method for calculating the depth of surface turbulence
Week 4	Prediction of water erosion/models based on physical foundations
Week 5	Prediction of water erosion/models based on statistical foundations
Week 6	The general equation for soil loss due to water erosion - the factor K, R
Week 7	The general equation for soil loss due to water erosion - the factor S and L
Week 8	The general equation for soil loss due to water erosion - the factor P and C
Week 9	Applying the general equation for soil loss due to water erosion in the field
Week 10	Slides and films about water erosion
Week 11	A field tour to see the manifestations of water erosion
Week 12	The general equation for wind erosion WEE
Week 13	Applying the general equation for wind erosion (WEE) in the field
Week 14	Films and slides about wind erosion
Week 15	Preparing reports on soil and water conservation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Database Systems 6th edition Ramez Elmasri	
Recommended Texts	Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials	
Websites	https://www.pdfdrive.com/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**principals of Irrigation &Drainage**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES305**				
ECTS Credits	5				
SWL (hr/sem)	75				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**		
Module Tutor	**Ruaa Nawfal Nafea Alshamaa**		**e-mail**	**Ruaaa9@ntu.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**01/04/2024**	**Version Number**	**1.0**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introducing the student to methods of delivering water and using it to irrigate agricultural land and acquiring the necessary skills to implement an irrigation project and irrigation systems therein and how to conduct them. Preparing and preparing the student to pay attention to digging and land reclamation and providing him with information to develop his necessary experience in field investigation work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals - The ability to determine the foundations of irrigation and drainage in dry areas. - The ability to determine climate elements in dry areas and irrigation methods - Study of plants and their relationship to the ecosystem and climate elements in dry areas - Identifying plant succession, Iraq's climatic zones, and its environmental types. Course-specific skills objectives. - The ability to discuss in a scientific spirit and express what constitutes a study of the subject. - The ability to communicate and inquire with the subject teacher - Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.

Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation, the physical characteristics of the soil, field capacity, wilting point, soil moisture and methods of measuring it, saturation.
Week 2	Water seepage and leakage, soil-seepage relationship, irrigation water preparation, water consumption and measurement methods
Week 3	Water standard, calculating irrigation depth, calculating sections for open channels and drainages using equations (Mank, Chezi, Darcy, optimal hydraulic section)
Week 4	Field surveys for irrigation and drainage projects, general planning for irrigation and drainage networks, levels of open canals
Week 5	Leakage from canals, lining of canals, its benefits, types of lining, materials used in lining.
Week 6	Land adjustment and leveling works (calculating the depths of excavation and backfilling)
Week 7	Surface irrigation, strip irrigation, and sprinkler irrigation.
Week 8	Calculator applications about irrigation.
Week 9	Puncture, introduction, excess water, its sources and effect on plants, methods of treating it, controlling sources of excess water.
Week 10	Permeability, permeability coefficient, measured in the laboratory, constant and variable pressure method, field method for measuring permeability (cylindrical hole method, piezometer method)
Week 11	Study theory, Forchheimer, types of trocars, open trocars, covered trocars, surface trocars and their calculations, calculating the spacing of subsurface trocars for homogeneous soils.

Week 12	Land reclamation, introduction to the land washing process, washing requirements, washing efficiency coefficient, water and salt balance for various saline lands, washing processes in saline soils and waterlogged soils.
Week 13	Trocar installations, trocar materials (tubes, pipe covers), special accounts
Week 14	Operating irrigation and drainage projects, stages of operation and maintenance of irrigation and irrigation, and maintenance sections.
Week 15	Drainage networks, operation of the drainage system, water drainage methods, types of maintenance of irrigation and drainage projects, maintenance machines and equipment, removing brush and reeds from streams and graveyards, maintenance of the drainage system, drainage problems in Iraq, land reclamation methods in northern, central and southern Iraq..
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Showing films and slides on irrigation, an experiment to determine the apparent and true density of the soil, solving problems about the physical properties of the soil.
Week 2	Solving problems about field capacity, an experiment to measure moisture content using the laboratory method, an experiment to measure moisture content using field methods.
Week 3	An experiment to estimate the rate of water flow into the soil, solve problems about water consumption, solve problems about water consumption, and calculate the number of plants.
Week 4	Calculating sections for open canals using different rates, drawing longitudinal and transverse sections of irrigation canals, experimenting with measuring water seepage from canals.
Week 5	A scientific visit to one of the irrigation projects.
Week 6	Conduct modification and adjustment work for a specific field
Week 7	Exercises on strip irrigation, exercises on sprinkler irrigation
Week 8	Calculator applications about irrigation
Week 9	Designating an area and conducting a survey of it, drawing a topographical map of the area, showing a scientific film on how to implement trocars.
Week 10	A scientific visit to one of the mining projects in the region.
Week 11	Collecting samples of ground water and measuring its electrical conductivity and exchangeable sodium ratio, a laboratory experiment to wash the soil of salts, water and salt balance issues.
Week 12	Placing a network of trocars in an area and taking the possibilities of changing the network. Drawing a longitudinal section of specific trocars and putting all the details on it along with the design of the trocars.
Week 13	Preparing schedules for periodic maintenance work and filling them out by the students, a scientific visit to the earthquake project, viewing the machines and excavators used in the implementation and maintenance work of the earthquake.
Week 14	Using the Internet to view the latest developments in puncture projects in the world
Week 15	Maintaining types of pumps used in drainage projects, identifying defects in drainage networks and how to fix them, discussing one of the drainage projects implemented in Iraq.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	محاضرات حسب المنهج المقرر	
Recommended Texts	تقنات الري الحديث ومواضيع اخرى في المسألة المائية / د. عصام خضر	
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Hydrology**			**Module Delivery**	
Module Type	Department requirements			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES203**				
ECTS Credits	3				
SWL (hr/sem)	5				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Desertification Control Technologies DES**	**College**	**Technical Agricultural College**	
Module Leader	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**	**Master**	
Module Tutor	**Omar Younis Hassan**		**e-mail**	**mti.lec224.omar@ntu.edu.iq**	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Hydrological cycle, rainfall, surface runoff, surface waterfall, groundwater, Darcy equation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals 1- The ability to identify the elements of water management in dry areas 2- Study of plants and their relationship to the ecosystem and climate elements in dry areas 3- Identify plant succession, Iraq's climatic zones, and its environment types. Course-specific skills objectives. 1- The ability to discuss in a scientific spirit and express what is involved in studying the subject. 2- The ability to communicate and inquire with the subject teacher 3- Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.
Indicative Contents المحتويات الإرشادية	1- That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	hydrologic cycle
Week 3	Hydrologic Measurements
Week 4	Precipitation
Week 5	ception and Depression Storage
Week 6	Evaporation and Transpiration
Week 7	Infiltration
Week 8	Runoff
Week 9	Surface Water Hydrology Hydrographs
Week 10	Statistical Methods in Hydrology
Week 11	Groundwater
Week 12	Ground water (forms)

Week 13	Water table Characteristics of Aquifers
Week 14	Darcy low
Week 15	Characteristics of wells Drilling of weels
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Average rainfall in stations
Week 2	Intensity-duration analysis
Week 3	Morphological analysis of basins
Week 4	Discharge measurement in rivers
Week 5	Separation of hydrographs
Week 6	Frequency analysis of flood
Week 7	Visit to the hydrological construction
Week 8	Flood routing
Week 9	Measurement of flow in Aquifers
Week 10	Seepage in hydraulic structures
Week 11	Flow line
Week 12	Average rainfall in stations
Week 13	Intensity-duration analysis
Week 14	Morphological analysis of basins
Week 15	Discharge measurement in rivers

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اسلوب ادارة المياه الحديث	
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Horticulture**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES351**				
ECTS Credits	60				
SWL (hr/sem)	60				
Module Level		**4rd Level**	**Semester of Delivery**		
Administering Department		**Department of Desertification Control Technologies DES**	**College**	**Tachnical agricultural college**	
Module Leader	**Mohammed salim ahmed**		**e-mail**	**mohameedsa66@ntu.edu.iq**	
Module Leader's Acad. Title		**lecturer**	**Module Leader's Qualification**	PHD	
Module Tutor	**Mohammed salim ahmed**		**e-mail**	**mohameedsa66@ntu.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**01/04/2024**	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Land scape,forestry,plant scince.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching and introducing students to gardening, its goals and purposes, its distribution in the world, the foundations of its establishment, the systems followed in it, and examples of producing some crops using it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. Ability to identify gardening methods. Learn about gardening and how to implement it in dry areas. Identifying plant succession, Iraq's climatic zones, and its environmental types. The ability to discuss in a scientific spirit and express what constitutes a study of the subject. The ability to communicate and inquire with the subject teacher Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and gardening.
Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Horticultural plant diseases
Week 2	Green production
Week 3	Plant breeding
Week 4	Beekeeping
Week 5	Deciduous fruit
Week 6	Medicinal and aromatic plants
Week 7	Decoration Plants
Week 8	Horticultural plant diseases
Week 9	Green production
Week 10	Farm management
Week 11	Seed production

Week 12	Harvest, care and store
Week 13	Protected agriculture
Week 14	Sustainable fruit
Week 15	Garden engineering
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Conditioned cultivation**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES352**				
ECTS Credits	4				
SWL (hr/sem)	60				
Module Level		**3rd Level**	**Semester of Delivery**		
Administering Department		**Department of Desertification Control Technologies**	**College**	**Tachnical agricultural college**	
Module Leader	**Mohammed salim ahmed**		**e-mail**	**mohameedsa66@ntu.edu.iq**	
Module Leader's Acad. Title		**lecturer**	**Module Leader's Qualification**	**PHD**	
Module Tutor	**Mohammed salim ahmed**		**e-mail**	**mohameedsa66@ntu.edu.iq**	
Peer Reviewer Name		**Name**	**e-mail**	**E-mail**	
Scientific Committee Approval Date		**01/4/2024**	**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Plant scince,siol,climate.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching and introducing students to air-conditioned agriculture, its goals, purposes, and distribution in the world, the foundations of its establishment, the systems followed in it, and examples of producing some crops using it..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. Ability to identify adapted farming methods. Learn about adapted agriculture and how to implement it in dry areas. Study of plants and their relationship to the ecosystem and climate elements in dry areas Identifying plant succession, Iraq's climatic zones, and its environmental types. The ability to discuss in a scientific spirit and express what constitutes a study of the subject. The ability to communicate and inquire with the subject teacher Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.
Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Historical overview - definition of adapted agriculture - goals and purposes.
Week 2	Principles for establishing air-conditioned agricultural facilities - location - orientation - area - shape.
Week 3	Climatic factors affecting plant growth in air-conditioned agriculture: temperature - light - humidity - CO2
Week 4	Ground factors affecting plant growth in air-conditioned agriculture - types of agricultural media.
Week 5	Construction of plastic tunnels and plastic houses: their shapes - types - plastic specifications.
Week 6	Constructing greenhouses: their shapes - types - type of glass.
Week 7	Methods of heating, cooling and ventilating air-conditioned homes.
Week 8	Production of vegetable seedlings in tunnels and air-conditioned houses.
Week 9	Cultivation systems inside air-conditioned houses: cultivation in ponds - rings - with straw machines - bags - rock wool - hydroponics.
Week 10	Production of some vegetable crops: tomato production.
Week 11	Production of some vegetable crops: production of pepper and eggplant.
Week 12	Production of some vegetable crops: production of cucumbers and squash

Week 13	Production of some vegetable crops: mushroom production
Week 14	Production of some fruit crops: production of strawberries and bananas.
Week 15	Production of some ornamental plants (sperm flowers and shade plants).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	View air-conditioned agricultural facilities: plastic tunnels - greenhouses - greenhouses.
Week 2	Technical specifications for plastic tunnels and methods of constructing them.
Week 3	Technical specifications for plastic houses and methods of constructing them.
Week 4	Technical specifications for plastic houses and methods of constructing them.
Week 5	Technical specifications for greenhouses and methods of constructing them.
Week 6	Training on heating, cooling and ventilation methods for air-conditioned homes
Week 7	Preparing and preparing houses for agriculture (land preparation - soil sterilization).
Week 8	Land planning - determining irrigation lines - connecting irrigation lines - fertilization.
Week 9	Training on methods of producing seedlings inside air-conditioned homes - planting in different containers
Week 10	Seedling service and care operations.
Week 11	Training on crop cultivation operations inside air-conditioned houses in different ways - basins - rings - bags with straw machines.
Week 12	Training on irrigation and fertilization of plants.
Week 13	Training in plant breeding and pruning.
Week 14	Training on vegetable crop service operations (cucumber - squash - chilik).
Week 15	Training on ornamental plant service operations (cut flowers - shade plants).

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Wild animals**			**Module Delivery**	
Module Type	**Department requirements**			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES353**				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level		**3 rd Level**	**Semester of Delivery**		
Administering Department		**DES** **Desertification Prevention Technology**	**College**	**TAMO** **Technical Agricultural College of Mosul**	
Module Leader	**Samir Farhan Ayoub**		**e-mail**	Samir.f.ayoub@ntu.edu.iq	
Module Leader's Acad. Title		Assit. Lecture	**Module Leader's Qualification**	Master	
Module Tutor	**Samir Farhan Ayoub**		**e-mail**	Samir.f.ayoub@ntu.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		2024/04/01	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**Learn about the history of nature protection** **Studying the role of natural reserves in continuous (sustainable) development.** **Study activities that do not contradict the objectives of the reserve**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Global classification of protected areas
Indicative Contents المحتويات الإرشادية	1-That what the student studies should be consistent with his inclinations and thinking trends 2- That the student feels the importance of correcting refractive errors in the eye 3-The student should listen carefully to the professor's explanation 4- That the student feels what cognitive excellence and excellence mean 5- That the student recognizes the impact of science and scientists 6-The student must pay attention to respecting the time and class system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Types of communication in the field of work 2- The ability to express and convey ideas clearly and confidently 3- Teamwork.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 15 أسبوع			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	30	**Structured SWL (h/w)**	5

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)**	3

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	A brief idea about fossil organisms
Week 2	Fishing and its development over time
Week 3	Factors negatively affecting wild animals
Week 4	Benefits of wild animals
Week 5	Damage to wild animals
Week 6	The relationship of wildlife science to other sciences
Week 7	The role of forests and agricultural and natural fields in sheltering wild animals
Week 8	The role of wild animals in forests
Week 9	Animal environment - some scientific terms
Week 10	Environmental factors affecting wild animals
Week 12	The spread of wild animals and their geographical distribution in the world
Week 13	Factors that help the spread of animals - Factors that limit the spread of wild animals in Iraq

Week 14	**Classification and scientific nomenclature of animals**
Week 15	**Wild animal management and its objectives**
Week 16	**Exam**

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	**The exhibition, fences, natural gardens, national parks and zoos**
Week 2	**mummification**
Week 3	**Biodiversity**
Week 4	**Nature protection**
Week 5	**The role of natural reserves in continuous development**
Week 6	**Specifications of areas that can be protected**
Week 7	**Global classification of protected areas**
Week 8	**An idea about the wild animals found in Iraq**
Week 9	**Diagnosing the age of wild wild animals**
Week 10	**Times of census of wild wild animals in enclosures**
Week 11	**Antler formation in young deer**
Week 12	**Tooth growth dates for red deer and young deer**
Week 13	**Scientific films and slides**
Week 14	**Visit the Natural History Museum**
Week 15	**Visit the Natural History Museum**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Database Systems 6th edition Ramez Elmasri	
Recommended Texts	Data Modeling Fundamentals: A Practical Guide for IT Data Modeling Essentials	
Websites	https://www.pdfdrive.com/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Socio- issues in dry lands**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES353**				
ECTS Credits	60				
SWL (hr/sem)	30				
Module Level	4		**Semester of Delivery**	1	
Administering Department	Department of Desertification Control Technologies		**College**	Tachnical agricultural college	
Module Leader	Samir farhan ayoub		**e-mail**	E-mail	
Module Leader's Acad. Title	**Asst.lecturer**		**Module Leader's Qualification**	MSC	
Module Tutor	Samir farhan ayoub		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/04/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Plant scince,water resurce.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. 1- Identifying biological communities in dry areas. 2- Identify the relationship of plants in the ecosystem. 3- Identify the biogeochemical cycles (nitrogen cycle - water cycle - carbon cycle - phosphorus cycle) 4- Identify the location of plants in the atmosphere and study climate factors in dry areas 5- Identifying climatic zones and plant succession. 6- Identify the dry and semi-arid climate and its regions in Iraq.
Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Definition of ecology, development, importance and relationship to other sciences, levels of study of ecology
Week 2	Biological communities, plants, animals, microorganisms, plant communities
Week 3	Plant species as an ecological unit, taxonomic orientation, biological division of the species, environmental decline, and species overlap.
Week 4	The plant in the ecosystem of planet Earth, its environmental components
Week 5	Solar energy, its transformations, biogeochemical cycles in the ecosystem
Week 6	Plant in the biosphere, its role, location, level in the energy pyramid, its relationship with consuming and decomposing organisms
Week 7	The biosphere, climate factors, factors affecting it, methods of gaining and transferring heat, heat exchange, temporal and locational differences in temperatures, the effect of heat
Week 8	Light, forms of radiation, local differences in light intensity, temporal variations of radiation, its effect on plants.
Week 9	Winds, their effects, types, the effect of vegetation on them, windbreaks, fires and their effects.
Week 10	Soil factor, air, evaporation force, soil revival, the effect of vegetative cover on the development of soil properties

Week 11	The water factor, the division of land areas on Earth, rain, forms of soil water, plants' adaptation to the water factor.

Week 12	The atmosphere, climatic zones, plant formations, and their distribution on the Earth's surface
Week 13	Vegetation cover, its types, steps of development, plant succession, aquatic succession
Week 14	Environment and plant communities in Iraq, topography, geographical areas, climatic conditions and plant formations
Week 15	
Week 16	

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Introduction to practical lessons in taking measurements, writing reports, and office research
Week 2	Units and measurements used in plant statistics and some arithmetic exercises.
Week 3	Studying the effect of climate on plants and devices for measuring climatic factors
Week 4	Studying the relationship of plants to environmental factors and learning about some phenomena during a field tour
Week 5	Measuring soil moisture and its relationship to plant growth and density
Week 6	Measuring salinity and its effect on the nature and distribution of vegetation.
Week 7	Measuring plant mass, green matter and plant residues
Week 8	Study of vegetation cover in terms of numerical density and diversity using the ascending squares method
Week 9	Study of vegetation cover in terms of the number and percentage of species in a plant community using the linear section method
Week 10	Study of plant stratification in a forest community and the proportion of plant species
Week 11	Measuring the height of plants and shrubs by the direct method and trees by the indirect method and classifying them by class

Week 12	Measuring plant density and leaf coverage of trees using a leaf density meter
Week 13	Study of plant ecology in terms of the relationship of plants to other organisms and their class distribution
Week 14	Studying the environment and characteristics of water bodies and the diversity of plants and dividing them according to the nature of their growth there
Week 15	Discussing research, reviewing reports, and evaluating practical results

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Natural reserves**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES354**				
ECTS Credits	60				
SWL (hr/sem)	30				
Module Level	3rd Level		**Semester of Delivery**		
Administering Department	Department of Desertification Control Technologies		**College**	Tachnical agricultural college	
Module Leader	Samir farhan ayoub		**e-mail**	E-mail	
Module Leader's Acad. Title	**Asst.lecturer**		**Module Leader's Qualification**	MSC	
Module Tutor	Samir farhan ayoub		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/04/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Forestry scince, wild animals,Natural pastures.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The concept of natural reserves, the foundations for their establishment, their role in sustainable development, and the study of natural reserves in the Arab world.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives 1- The ability to identify the elements of ecosystem reserves in dry areas. 2- The ability to identify climate elements in dry areas 3- Study of plants and their relationship to the ecosystem and climate elements in dry areas and natural reserves 4- Identifying plant succession, Iraq's climatic zones, and its environment types. B- The skills objectives of the course. 1- Communicating in collecting information and weather reports, temperature and rainfall rates 2- The ability to discuss in a scientific spirit and express what is involved in studying the subject. 3- The ability to communicate and inquire with the subject teacher 4- Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.

Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	A brief history of nature protection
Week 2	Reasons for establishing natural reserves
Week 3	The role of natural reserves in continuous (sustainable) development.
Week 4	**Specifications of areas eligible to become a protected area**
Week 5	Activities that do not contradict the objectives of the reserve
Week 6	Global classification of protected areas
Week 7	Steps to follow when placing a piece to create a reserve
Week 8	Natural reserves in the Arab world
Week 9	Nature reserves in Iraq
Week 10	Nature reserves in Lebanon
Week 11	Nature reserves in Jordan

Week 12	Nature reserves in Syria
Week 13	Nature reserves in the Arabian Gulf
Week 14	Nature reserves in Oman
Week 15	Nature reserves in Jordan
Week 16	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX** - Fail	راسب)قيد المعالجة(	(45-49)	More work required but credit awarded
(0 - 49)	**F** - Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Water , soil and plant relationship**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES356**				
ECTS Credits	5				
SWL (hr/sem)	75				
Module Level	3rd Level		**Semester of Delivery**	1	
Administering Department	Department of Desertification Control Technologies		**College**	Tachnical agricultural college	
Module Leader	Roaa nawfal nafaa		**e-mail**	E-mail	
Module Leader's Acad. Title	**Asst.lecturer**		**Module Leader's Qualification**	MSC	
Module Tutor	Roaa nawfal nafaa		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/4/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Siol scince, water scince, plant scince.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching and introducing students to the physical and chemical relationships between soil and water on the one hand, and soil and plants, and how the chemical and physical properties of the soil affect the properties of soil water and the mechanism of nutrition, absorption, and ionic exchange of nutrients between the soil, the plant, and the soil solution..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives 1- The ability to relate to soil, water and plants. 2- Learn about ways to reuse water in dry areas. 3- Study of plants and their relationship to the ecosystem and climate elements in dry areas 4- Identifying plant succession, Iraq's climatic zones, and its environment types. B- The skills objectives of the course. 1- The ability to discuss in a scientific spirit and express what is involved in studying the subject. 2- The ability to communicate and inquire with the subject teacher 3- Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.

Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Physical properties of soil and their effect on plant growth
Week 2	Physical properties of soil and their effect on plant growth
Week 3	Chemical properties of soil and their effect on plant growth
Week 4	**Chemical properties of soil and their effect on plant growth**
Week 5	Chemical properties of soil and their effect on plant growth
Week 6	Soil salinity and its effect on plant growth
Week 7	Soil salinity and its effect on plant growth
Week 8	Mineral nutrition and its relationship to plant growth
Week 9	Mineral nutrition and its relationship to plant growth
Week 10	Water and its relationship to plant growth
Week 11	Water and its relationship to plant growth

Week 12	Water and its relationship to plant growth
Week 13	Water and its relationship to plant growth
Week 14	The various stresses to which the plant is exposed
Week 15	The various stresses to which the plant is exposed
Week 16	

Delivery Plan (Weekly Practical Syllabus) المنهاج الأسبوعي العملي	
	Material Covered
Week 1	Methods for estimating water potential in leaves (plants)
Week 2	Methods for estimating water potential in leaves (plants)
Week 3	Comparing the growth and development of root systems in soils of different textures
Week 4	Comparing the growth and development of root systems in soils of different textures
Week 5	The effect of soil bulk density on root growth and development
Week 6	The effect of soil bulk density on root growth and development
Week 7	The effect of soil bulk density on root growth and development
Week 8	Estimating the potential of water in soil and soil and finding a relationship between them
Week 9	Estimating the potential of water in soil and soil and finding a relationship between them
Week 10	The effect of ventilation on root growth and their efficiency in absorbing ions
Week 11	The effect of ventilation on root growth and their efficiency in absorbing ions
Week 12	Measuring the daily transpiration rate of different plants
Week 13	Measuring the daily transpiration rate of different plants
Week 14	Measuring the effect of total leaf area and root system efficiency on transpiration rate
Week 15	Measuring the effect of total leaf area and root system efficiency on transpiration rate

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Water Reusorce reuse**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES357**				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level	4		**Semester of Delivery**	1	
Administering Department	Department of Desertification Control Technologies		**College**	Tachnical agricultural college	
Module Leader	Naderaa abbas mohammed		**e-mail**	E-mail	
Module Leader's Acad. Title	**lecturer**		**Module Leader's Qualification**	phd	
Module Tutor	Naderaa abbas mohammed		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/04/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Hydrology, Waste water.	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introducing the student to the concept of recycled water, its types, treatment technology, and wastewater, the possibility of benefiting from it and its risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives 1- The ability to determine ways to reuse water. 2- Learn about ways to reuse water in dry areas. 3- Study of plants and their relationship to the ecosystem and climate elements in dry areas 4- Identifying plant succession, Iraq's climatic zones, and its environment types. B- The skills objectives of the course. 1- The ability to discuss in a scientific spirit and express what is involved in studying the subject. 2- The ability to communicate and inquire with the subject teacher 3- Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.

Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	The concept of recycled water. The water sources used are surface runoff water, drainage water, and high ground water
Week 2	Methods used to reuse all types of irrigation water
Week 3	Wastewater treatment processes, standards and principles of reuse methods
Week 4	**Poor quality irrigation water (pollution standards and standards and methods of reuse. Types of appropriate irrigation methods)**
Week 5	Groundwater with salt content and methods for adapting its use in irrigation systems that rely on groundwater as a primary source
Week 6	Low cost technology for water reuse
Week 7	Sewage, waste water. Characteristics of wastewater: Components and sources of pollutants in wastewater
Week 8	Wastewater treatment operations. Methods of water disposal and usage. Choosing treatment methods. Processing stages. Oxidation and stabilization lakes.
Week 9	Advantages and importance Disadvantages of oxidation lakes.
Week 10	Sanitation considerations Factors affecting the operation of oxidation lakes.
Week 11	Sludge Reuse of sludge (solid sediments) What is sludge and its types.

Week 12	Its chemical composition. Using sludge as a fertilizer.
Week 13	Risks of using treated wastewater and sludge in irrigation and agriculture, biological risks, toxins and risks of toxic substances.
Week 14	Reuse of wastewater in groundwater recharge and recharge, and agricultural and industrial use of water.
Week 15	Use of tertiary treatment (filtration, absorption, reverse osmosis) Article: Use of wastewater, its recycling, and its benefits.
Week 16	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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Fail Group	**FX** - Fail	راسب)قيد المعالجة(	(45-49)	More work required but credit awarded
(0 - 49)	**F** - Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Desert Management**			**Module Delivery**	
Module Type	Department requirement			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☒**Practical** ☐ **Seminar**	
Module Code	**DES358**				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level		3rd Level	**Semester of Delivery**		1
Administering Department		Department of Desertification Control Technologies	**College**	Tachnical agricultural college	
Module Leader	Samir farhan ayoub		**e-mail**	E-mail	
Module Leader's Acad. Title		**Asst.lecturer**	**Module Leader's Qualification**		msc
Module Tutor	Samir farhan ayoub		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1-6-2019	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Geomorphology, geology**, soil .	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching and introducing students to the management of dry and semi-arid lands and their importance, dry farming systems, environmental factors prevailing in dry lands and their effects on plants.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write atleast 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives 1- The ability to determine ways to reuse water. 2- Learn about ways to reuse water in dry areas. 3- Study of plants and their relationship to the ecosystem and climate elements in dry areas 4- Identifying plant succession. B- The skills objectives of the course. 1- The ability to discuss in a scientific spirit and express what is involved in studying the subject. 2- The ability to communicate and inquire with the subject teacher 3- Writing reports related to the subject's vocabulary after identifying the scientific sources available in the library on topics related to the environment and dry areas.

Indicative Contents المحتويات الإرشادية	Types of communication in the field of work The ability to express and convey ideas clearly and confidently Teamwork.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Theoretical exams (daily, monthly, final) Oral exams Participations inside the hall Homework

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراس المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)**	7

Unstructured SWL (h/sem) الحمل الدراس غترالمنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)**	6

Total SWL (h/sem) الحمل الدراس الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to the desert
Week 2	Drylands management
Week 3	Water supply
Week 4	**The importance of plants in drylands**
Week 5	Types of desert plants
Week 6	Stop the encroachment of sand dunes
Week 7	Reducing sand storms
Week 8	Reducing desert encroachment
Week 9	Tourism in deserts
Week 10	Tourism in deserts
Week 11	The economic importance of deserts

Week 12	The economic importance of deserts
Week 13	The possibility of utilizing desert to establish clean energy production complexes
Week 14	The possibility of utilizing desert to establish clean energy production complexes
Week 15	
Week 16	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Required prescribed books Electronic references, Internet sites...	
Recommended Texts	Recommended books and references (scientific journals, reports,....)	
Websites	Electronic references, Internet sites...	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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Fail Group	**FX** - Fail	راسب)قيد المعالجة(	(45-49)	More work required but credit awarded
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