Course Description Form

1. Course Title:	
Plant nutrition	
2. Course Code:	
AGHO24_F2091	
3. Semester / Year:	
Second semester –spring -2023-2024	
4. The history of preparation of this description	
1/2/2024	
5. Available Forms of Attendance:	
Compulsory	
6. Number of Credit Hours (Total) / Number of Units (Total):	
Theory 2 – practical 3 /3.5 units	
7. Course administrator's name (if more than one name)	
Assist . Prof. Fatih Abid Hassan Assist. Lecturer. Reem Waleed Abdalgabbar	
8. Course Objectives	
Practical: – **Enable the student to identify the methods of plant sampling, digestion and preparation for chemical analysis.** – **Introducing the student to the most important methods of measuring the plant content of elements.** – **Introducing the student to the most important methods of preparing nutrien solutions.**	**Theoretical:** **1- Preparing students with the ability to work in the field of plant nutrition and the use of fertilizers according to the modern scientific method to keep pace with the development in this field and entry into the agricultural sector efficiently by participating in agricultural projects and the labor market.** **2- Enable the student to diagnose the symptom of nutrient deficiency on the plant and processe**
9. Teaching and Learning Strategies	

Practical : **- The student is assigned to submit a report on each experiment** **- Assigning the student the duty of solving mathematical problems** **- Commissioning teamwork to reveal leaders skills** **- Assigning the student to make posters or mod**	**Theoretical:** **- Interactive lectures** **- Dialogue and discussion** **- Assigning students to make reports** **- Display illustrative images** **Scientific reports on the subject of study.** **Conduct weekly and monthly tests**

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	The week
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Introduction to the importance plant nutrition , definitions General , the origin and development of science Practical: Laboratory work guidelir identification Laboratory equipment, meth of expressing concentrations Chemical solutions and nutri concentrations Inside the plant	Theoretical: The student is aware of information about Origin and stages development of plant nutrition Practical: The student gets know types laboratory equipment And how it works and how express concentration elements in the plant	2theoretic 3Practical	1
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Essential components of the plant Practical: Plant sampling and preparat for chemical analysis	Theoretical: The student gets know mineral composition of plant and the factors affecting it Practical: The student gets know Conditions taking the sample from field, drying grinding and preparing it chemical analysis	2theoretic 3Practical	2

Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Plant Growth Media Practical: Digestion of plant samples	Theoretical: The student knows the types of food Farms and its importa and advantages and disadvantages each type Practical: The student learns how to digest a plant sample ways digestion and advantages of and disadvantages each method	2theoretic 3Practical	3
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Nutrient absorption Practical: Preparation acidic extract of plant sample	Theoretical: The student gets know absorbing forms Nutrients and the factors affecting it Practical: The student can Preparation extract acidity of plant samples	2theoretic 3Practical	4
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report .	Theoretical: Root, water absorption and nutrients Practical: Estimating the Cationic Exchange capacity of roots	Theoretical: The student learns about structure of the root and how absorb water and the factors affect it Practical: The student knows the methods estimating Root exchange	2theoretic 3Practical	5

			capacity		
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Nutrient absorption theories – Theories of negative and active absorption Practical: Preparation of nutrient solution	Theoretical: The student gets know absorption theories Negative and active Practical: The student can prepare Nutrient solutions of three or four salts	2theoretic 3Practical	6
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: nitrogen its presence in the soil , its importance for the plant ,Its transformations in plant ,factors affecting it, symptoms of deficiency Practical: Determination of Total Nitrogen in Plant Samples	Theoretical: The student gets know The importance of nitrogen and the way it absorbed and transformations within the plant and the symptoms its deficiency methods Addressed Practical: The student can Determination nitrogen- method Kjeldahl- and how calculate Concentration in different units	2theoretic 3Practical	7
Quiz, assigning an assignment ,	Theoretical: Audio styles, writing on the blackboard, direct dialogue	Theoretical: phosphorus its presence in soil , its importance for the plant , its transformations in plant factors affect in it, symptoms of deficiency , applied use of fertilizers Phosphate	Theoretical: The student gets know the importa of phosphorus and the way it absorbed and transformations within the plant	2theoretic 3Practical	8

discussions	style. Practical: Assignment and report	Practical: Determination of phosphorus in plant samples	and the symptoms its deficiency Practical: The student estimate Phosphorus in chromatic way and how to calculate concentration In different units		
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Potassium, its presence in the soil, its importance for the plant ,factors affecting it, symptoms of deficiency , applied use of Potash fertilizers Practical: Determination of Potassium and Sodium in Plant Samples	The student gets know the importa of potassium and the way it absorbed and transformations within the plant and the symptoms its deficiency Practical: The student estimate Potassium and sodium using a flame device and how to calcul the concentration In different units	2theoretic 3Practical	9
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: calcium, its presence in the soil Importance of the pl influencing factors , symptoms deficiency, applied use of calcium fertilizers. Practical: Determination of calcium in plant samples	Theoretical: The student recognize on importance calcium and the way it absorbed and transformations within the plant and the symptoms its deficiency methods addressed	2theoretic 3Practical	10

			Practical: The student estimate calcium Using chelating substances and how to calculate concentration In different units		
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Magnesium, the importance magnesium for the plant, factor Affecting Magnesium Symptoms deficiency ,magnesium fertilizers. Practical: Determination of calcium + magnesium in plants	Theoretical: The student recognize On the importa of magnesium and the way it absorbed and transformations within the plant and the symptoms its deficiency methods addressed Practical: The student estimate calcium Magnesium using recombinat with chelating substanc	2theoretic 3Practical	11
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: Sulfur, importance of the plant , its presence in soil, the sources , transformations in the plant, Symptoms of deficiency. Practical: Determination of sulfur in plant samples	The student gets know the importance of sulfur and the way it is absorbed and transformations within the plant and the symptoms its deficiency methods addressed Practical: The student	2theoretic 3Practical	12

			estimate Sulfur using method turbidity		
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: iron and zinc in the soil, absorption and transformation within the plant, physiological significan and symptoms of deficiency. Practical: Determination of iron by chromatography method in plant	Theoretical: The student recognize on the importance both Iron and zinc method absorption transformation within plant and symptoms deficiency Practical: The student estimate iron by the color method	2theoretic 3Practical	13
Quiz, assigning an assignment , discussions	Theoretical: Audio styles, writing on the blackboard, direct dialogue style. Practical: Assignment and report	Theoretical: manganese and copper in the soil, absorption and transformation within the plant, physiological significan and symptoms of deficiency. Practical: Determination of iron, zinc, manganese and copper in Plant using atomic absorber	Theoretical: The student recognize on the importance both manganese , copper and metho Absorption transformation within plant and symptoms deficiency and ways to treat them Practical: The student estimate micro element cations	2theoretic 3Practical	14
Conductig	Theoretical: Audio styles,	Theoretical: Boron and molybdeum in the soil, absorption	The student gets know the importa of boron	2theoretic 3Practical	15

Quiz, assigning an assignment , discussions	writing on the blackboard, direct dialogue style. Practical: Assignment and report	and transformation within plant, importance physiological and deficiency symptoms. Practical: Determination of boron and molybdium in plants	and molybdeum and absorption transformation within the plant Symptoms deficiency methods addressed Practical: The student estimate Boron and molybdeum		

11. Course Evaluation

Relative Weight%	Grade	Calendar date (week)	Calendar methods	T
13%	7Theoretical +6Practical	Theoretical week 15 Practical week 1-15	Theoretical Final Report + Practical Experience Reports	1
6%	4Theoretical +2Practical	Week (3)	Quiz (1)	2
15%	10 Theoretical +5Practical	Week (9)	Mid-term exam. (theoretical + practical)	3
6%	4Theoretical +2Practical	Week (12)	Quiz (2)	4
20%	20	Practical exams week	Final Practical Test	5
40%	40	Theoretical exams week	Final theoretical test	6
100%	100		Total	

12. Learning and Teaching Resources

Plant Nutrition - Menkel and Kirby - translated Dr. Saad Allah Al-Nuaimi	Required textbooks (methodology, if any)
Fertilizers and soil fertility - Dr. Saad Allah Al-Nuaimi	Main references (sources)
Soil fertility and fertilization-Dr.Kazem Mashh awad Plant physiology . Dr. Abdul azim Kazem	Recommended books and references (scientific journals, reports...)
FAO	Electronic References, Websites

Mr. Fatih Abid Hassan

Mr. Reem Waleed Abdalgabbar

Mr. Fatih Abid Hassan
Theoretical subject lecturer

Mr. Reem Waleed Abdalgabbar
Practical subject lecturer

Dr. Nabil Muhammad Amin
Chairman of the Scientific Committee

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