Course Description Form

1. Course Name:
Plant Growth Regulators
2. Course Code:
PLGR307
3. Semester / Year:
Second Semester (Spring) / 2023-2024
4. Description Preparation Date:
1/2/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
(2 theoretical + 3 practical = 5 hours) ×15 weeks = 75 hours / 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Prof. dr. Omar A. Abdulqader Email: edu3ab@uomosul.edu.iq Name: Assist. Lect. Khalil Ibrahim Khalil Email: khaleelibk@uomosul.edu.iq
8. Course Objectives

Theoretical:	Practical:
- Introducing the student to agricultural growth regulators and the role of growth hormones in plant life. - Clarifying most of the physiological phenomena controlled by plant hormones such as growth, seed germination, dormancy of buds and seeds, fruit ripening and aging. - Introduce the student to how to use organizations in a correct scientific way and their interactions with each other. - Introducing the student to how to use growth organizations and obstacles in the practical aspect for the purpose of increasing the yield.	- The student acquires the skill of preparing solutions from growth regulators in addressing negative physiological phenomena and improving positive phenomena for the purpose of increasing production. - Conducting scientific experiments to see the effect of growth regulators. - Detection and appreciation of phytohormones and growth regulators.

- Introducing the student to how to address some of the phenomena that accompany plant growth	

9. Teaching and Learning Strategies

Theoretical:	Practical:
- Interactive Lecture - Brainstorming - Dialogue and discussion - Assignment and report - Presentations of models of the effects of growth regulators on agricultural crops. - It is tasked with preparing a report on one of the topics of growth organizations and discussing it in it. - Scientific visits.	- Commissioning teamwork to reveal leadership skills. - Assigning tasks and a report for each experiment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical 3Practical	**Theoretical(a1,c1):** The student learns about the types of growth regulators and plant hormones, how to apply growth regulators in increasing the yield **Practical(b1):** examines and distinguishes the types of diffusers solutions	**Theoretical:** Introduction to Hormones and Growth Regulators **Practical:** Learn about the shapes of growth regulators	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
2	2Theoretical 3Practical	**Theoretical(a2,c2):** The student is introduced to Auxin, Measures and adjusts the concentration of solutions to suit the needs of plants **Practical(c7):** determines the concentration and type of diffuser solutions	**Theoretical:** Auxin: discovery, existence, Transmission in the plant **Practical:** How to prepare Auxin	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
3	2Theoretical 3Practical	**Theoretical(a3):** Knows what measures of biological responses are **Practical(b2):** Reveals using a regulated concentration using standard solutions	**Theoretical:** The mechanism of action of Auxin and their physiological effects **Practical:** Auxin Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions

4	2Theoretical 3Practical	**Theoretical(a4):** Through the degree of response, the student identifies the internal content of auxins **Practical(b3):** Measures growth, rates and its impact on Auxin, GA and CK	**Theoretical:** gibberellins, their discovery, presence and transmission in plants **Practical:** how to prepare gibberellins	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style, scientific visit **Practical:** assignment and report	Quizzes, assignments, discussions
5	2Theoretical 3Practical	**Theoretical(a5):** The student learns about the nature of growth in plants, including the balance of hormones that stimulate and inhibit growth **Practical(b4):** Reveals the physiological effects of gibberellins by experiment	**Theoretical:** Gibberellins **Practical:** Gibberellins Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
6	2Theoretical 3Practical	**Theoretical(a6,c3):** Identify the importance of CK in the reproductive tissues of plants, determine the pathways of biosynthesis of CK, identify and treat the causes of leaf and fruit loss **Practical(b5):** distinguish between the effect of both CK and GA	**Theoretical:** Cytokinins: Definition and Location, Biostructure, Biosynthesis **Practical:** How to prepare Cytokinins	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
7	2Theoretical 3Practical	**Theoretical(a7,c4):** The student learns about the mechanism of action of the CK, determining and modifying the shelf life of the leaves, predicting the date of flowering and maturity **Practical(b6):** Reveals the mechanism of action of cytokinins and their physiological effects through an experiment	**Theoretical:** Cytokinins: mechanism of action, physiological effects, Cytokinins and Senescence **Practical:** Cytokinins Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
8	2Theoretical 3Practical	**Theoretical(a8,c5):** Illustrates the method of ethylene transmission, determining the ripening period **Practical(b7):** Tests the effect of ethylene on broad, thin-leaved plants	**Theoretical:** Ethylene Motion and Transmission **Practical:** Ethylene Preparation Method	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style, scientific visit **Practical:** assignment and report	Quizzes, assignments, discussions
9	2Theoretical 3Practical	**Theoretical(a9):** ethylene and Obsolete Senescence and Maturation Events in Plants	**Theoretical:** Ethylene: mechanism of action, physiological effects, economic importance of ethylene	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style	Quizzes, assignments, discussions

		Practical(b8): He conducts experiments on plants demonstrating the physiological effects of ethylene	**Practical:** Ethylene Experiments	**Practical:** assignment and report	
10	2Theoretical 3Practical	**Theoretical(a10,c6):** Identify the mechanism of effect of ABA in stomata and plant dyes, Explains the reasons for the low efficiency of water consumption **Practical(b9):** examines the effects of paper treatment with ABA	**Theoretical:** Growth Inhibitors (ABAs) **Practical:** Preparation method (ABA)	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
11	2Theoretical 3Practical	**Theoretical(a11):** Recognizes the cons of high ABA **Practical(e1):** Determines the preference of treatment with ABA and salicylic in stimulating plants to resist drought and salinity	**Theoretical:** Physiological Effects of ABA **Practical:** ABA Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
12	2Theoretical 3Practical	**Theoretical(a12):** Shows the impact of good and bad obstacles **Practical(b10):** Measures growth inhibitors	**Theoretical:** growth inhibitor and their agricultural importance. **Practical:** Experiences of Growth inhibitor	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
13	2Theoretical 3Practical	**Theoretical(a13):** A scientific debate justifies and governs the use of growth regulators in modern technologies **Practical(e2):** the properties of growth regulators decide how to use them in tissue culture	**Theoretical:** the use of growth regulators in modern technologies **Practical:** Tissue Culture Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
14	2Theoretical 3Practical	**Theoretical(a14):** Identifying the positive and negative role of growth regulators in bringing about genetic mutations **Practical(c8):** Identifies growth regulators that create the effect of genetic mutations	**Theoretical:** the use of growth regulators in modern technologies **Practical:** Experiments with Genetic Mutations	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions
15	2Theoretical 3Practical	**Theoretical(a15):** Explains the types and roles of growth regulators that are related to seed dormancy and germination **Practical(b11):** characterizes the effect	**Theoretical:** The Role of Growth Regulators in Dormancy and Post-Harvest **Practical:** Breaking seed dormancy Experiments	**Theoretical:** auditory styles, blackboard writing style, direct dialogue style **Practical:** assignment and report	Quizzes, assignments, discussions

		of growth regulators in post-harvest dormancy			

11. Course Evaluation

No.	Evaluation methods	Calendar date (week)	Grade	Relative weight %
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Quiz (1)	Sixth week	2	2
4	Quiz (2)	Fourteenth week	2	2
5	Quiz (3)	Fifteenth week	1	1
6	Semester Exam (1)	Sixth week	7.5	7.5
7	Semester Exam (2)	The first week is difficult	7.5	7.5
8	Final theoretical test	Final Semester Exams	40	40
9	Practical field project	Fifteenth week	5	5
10	Field Assessment	Third and fifth week	2	2
11	Practical Quiz (1)	First week	1	1
12	Practical Quiz (2) Quiz	Fourth week	0.5	0.5
13	Practical Quiz (3) Quiz	Fourteenth week	1	1
14	Homework and discussions	All weeks	5.5	5.5
15	Final Practical Test	Final Semester Exams	20	20
	Total	100	100%	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures prepared by the subject teacher
Main references (sources)	**Rademacher, W. (2015).** Plant growth regulators: backgrounds and uses in plant production. Journal of plant growth regulation, 34, 845-872. **Davies, P. J. (Ed.). (2012).** Plant hormones and their role in plant growth and development. Springer Science & Business Media.

Recommended books and references (scientific journals, reports...)	**Srivastava, L. M. (2002).** Plant growth and development: hormones and environment. Elsevier. **Plant hormones articles from across Nature Portfolio** https://www.nature.com/subjects/plant-hormones
Electronic References, Websites	https://byjus.com/neet/plant-hormones/ https://www.sciencedirect.com/topics/neuroscience/plant-hormone https://organismalbio.biosci.gatech.edu/chemical-and-electrical-signals/plant-hormones-and-sensory-systems/

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