Department of Biology

College of Education- Shaqlawa

Salahaddin University

Subject: Plant Physiology

Course Book – (4th Stage)

Lecturer's name: Dr. Mohammed Omer Hamadameen Barznji

Academic Year: 2022/2023 First Course

Course Book

1. Course name	**Plant Physiology**
2. Lecturer in charge	**Dr. Mohammed O. Hamadameen Barznji**
3. Department/ College	**Biology/ College of Education- Shaqlawa**
4. Contact	**e-mail: mohammed.hamadameen@su.edu.krd**
5. Time (in hours) per week	**Theory: 2 hrs.** **Practical: 2 hrs.**
6. Office hours	**Mon: 8:30-2.30 , Tue: 10:30-2:30**
7. Teacher's academic profile	I was awarded B.Sc. in 2007/2008 in plant production dep., and M.SC. in 2013 in the field of Plant Breeding and Genetics. I received Ph.D. in Crop Ecology in 2022. Genetics, Plant Physiology, Plant Anatomy and Statistics are my interest area of expertise. **The researches published that are:** 1. Full Diallel Cross Anaysis in Maize for Yield Component Traits. 2015. 2. Full diallel crosses for estimation of genetic parameters in maize. 2017. 3. Effect of maize succession with some winter crops on soil NPK and organic matter. 2021. 4. Effect of Maize Succession with Some Winter Crops on Growth and Productivity of Maize. 2022. **Teaching:-** Undergraduate: Plant Physiology, Computer Application
8. Keywords	Plant physiology, academic profile, Course book
9. Course overview: Plant physiology is that branch of plant sciences that aims to understand how plants live and function. Its objective is to explain all life processes of plants by a minimal number of comprehensive principles founded in chemistry, physics, and mathematics. Plant physiology studies the ways in which plants absorb	

minerals and water, grow and develop, flower and bear fruit. It also deals with photosynthesis, respiration, biosynthesis and the accumulation of substances and translocation, which together enable plants to grow and reproduce them. In the first half of the 20th century, plant physiology became more closely linked with biochemistry and biophysics and made more extensive use of such physicochemical methods as spectral analysis and mass spectrometry, ultraviolet electron microscopy, differential centrifugation, chromatography, and isotope indication. These methods enabled scientists to conduct research at the cellular, subcellular, and molecular levels and obtain fundamentally new data on the mechanisms regulating the entire complex of life processes and the way in which they function as integral systems.	

10. Course objective:

1. To learn how plants “work” at cell, tissue, organ and the whole plant level.
2. To develop and enhance skills through a variety writing assignments. This course introduces basic principles of plant function, primarily covering physical processes in plants, metabolism, cell physiology, and introducing principles of growth and development.
3. To gain an understanding of the processes that are important to the normal functioning of plants.

11. Student's obligation

1. Students are expected to attend all classes.
2. preparing reports and seminars
3. performing exams and quizes

12. Forms of teaching

Power point presentation for head titles, summary, definitions, classifications of materials and any other illustrations will be used to reach the objectives of the course. Supplementary reading will be required from books and photocopies reserved in the library.

13. Assessment scheme

Approximately 2 unit examinations will be given during the course. Each exam will consist of fill blanks, definitions and discussion questions. Any student who misses a scheduled exam without a valid excuse will receive a grade of "0" with no opportunity to make up the exam. The semester grade is based on the average score of two lecture exams, the final exam and lab reports. Points are awarded for class attendance. Excessive absences may affect the final grade (see below):

1- One monthly theoretical examination = 10%
2- Quiz, Seminar and Report, Attendance = 5%
3- Laboratory examination (2monthly + experiment reports+ qiuz)=35%
4- A comprehensive final examination 50% (theoretical).

14. Student learning outcome:

Each Student will:

• demonstrate understanding the role of water in plant life.
• demonstrate understanding water potential and its uptake and transport and effect on cellular function.
• demonstrate understanding soil plant water relation.
• demonstrate understanding of growth developmental patterns and processes of plants*
•demonstrate understanding organelle function at the cellular level of cell.
• demonstrate detailed understanding of the physiological mechanisms of xylem and phloem translocation and materials translocated in xylem and phloem sap.
• demonstrate understanding of the metabolic pathways such as photosynthesis and respiration in energy acquisition and use during plant development.
• demonstrate understanding of the major effects and physiological mechanisms of growth regulators (hormones) in plants.

15. Course Reading List and References:

- Key references:
- Useful references:
- Magazines and review (internet):

16. The Topics:

Lecturer's

Weeks	Topics	
1	Introduction & course book	**Mohammed O. Hamadameen Barznji**
2	Water & Plant relation	
3	Water potential	
4	Soil Plant Water relation	
5	Growth and Development	
6	Photosynthesis	
7	Photosynthesis	
8	Respiration	
9	Translocation in the Phloem	
10	Plant Growth Regulators	
11	Monthly examination 1	

17. Practical Topics (If there is any)

18. Examinations:

1. Compositional:

What is Photorespiration? Why is wasteful reaction?

Answer: In the "normal" reaction, CO2 is joined with RUBP to form 2 molecules of 3PGA. In the process called photorespiration, O2 replaces CO2 in a non-productive, wasteful reaction. Less ATP Is Produced from the Photorespiration The appearance of C4-type plants appears to be an evolutionary mechanism by which photorespiration is suppressed because PEP Carboxylase has a much higher affinity for CO2 than does Rubisco in C3 plants.

2. True or false type of exams:

1-Appoplast involves cytoplasm and plasmodesmata.

2-Pressure decreases speed of molecules, therefore, decrease the rate of diffusion.

3-Aquaporins facilitate the diffusion of water and small neutral solutes across plant cell membranes.

4- A cell in a hypotonic solution will take up water, generating a hydrostatic pressure (turgor pressure) in the cell.

5- Dialysis is specialized case of diffusion; it is the diffusion of solvent across a semi-permeable membrane.

6-The mole fraction of solvent = # solvent molecules/ total (# solvent molecules + # solute molecules). *Answer: 3, 4 and 6 true and others (1, 2 and 5) false.* 1-Symplast involves cytoplasm and plasmodesmata. 2-Pressure increases speed of molecules, therefore, increase the rate of diffusion. 5- Dialysis is specialized case of diffusion; it is the diffusion of solvent across a semi-permeable membrane. ***3. Multiple choices:*** 1-Short-Distance Transport Involves: a-simple diffusion b-bulk flow c- active transport 2-The light reaction of photosynthesis supply calvin cycle with: a-light energy b-CO2 c-H2O d-NADPH e-sugar f-ATP **Answer**: 1(a&c), 2(d&f) 4***. Fill blanks*** 1-Between the two leaves epidermis there is---------- which called ---------- tissue. 2- Lateral root originates from the ---------- cells. **Answer**: 1- Mesophyll, Chlorenchyma 2- Pericycle	
19. Extra notes:	
20. Peer review	