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**Department of Forestry**

**College of Agriculture**

**University of Salahaddin**

**Subject: Forest Trees Physiology**

**Course Book – *3rd* Year**

**Lecturer's name: Assist Lecturer Hardy Kakakhan Awla**

**Academic Year: 2017/2018**

**Course Book**

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| **1. Course name** | **Fall Semester / Forest Trees Physiology** |
| **2. Lecturer in charge** | Assist Lecture**r Hardy Kakakhan Awla**  |
| **3. Department/ College** | **Forestry / Agriculture** |
| **4. Contact** | **e-mail:** **hardy.awla@su.edu.krd****Tel: ( 07504838690 )** |
| **5. Time (in hours) per week**  | **Theory: 0** **Practical: 3**  |
| **6. Office hours** | **Saturday until Wednesday** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  |  **I have finished my B.Sc. in Koya University – Agriculture college - Forestry Department 2008; I have got M.Sc. in Salahaddin University - Hawler – Agriculture college – Forestry and Horticulture department 2014. Nowadays I am working as Assist Lecturer in Department Forestry- agriculture college.** |
| **9. Keywords** |  |
| **10. Course overview:** Preparing and carrying out experiments in plant physiology as in studying colloidal solutions and its characteristics, and phenomenon such as osmosis, diffusion, permeability and describing water relations such as; absorption, diffusion, study of all the internal activities of plants—those chemical and physical processes associated with [life](http://en.wikipedia.org/wiki/Life) as they occur in plants. This includes study at many levels of scale of size and time. At the smallest scale are [molecular](http://en.wikipedia.org/wiki/Molecule) interactions of [photosynthesis](http://en.wikipedia.org/wiki/Photosynthesis) and internal [diffusion](http://en.wikipedia.org/wiki/Diffusion) of water, minerals, and nutrients. At the largest scale are the processes of plant [development](http://en.wikipedia.org/wiki/Developmental_biology), [seasonality](http://en.wikipedia.org/wiki/Season), [dormancy](http://en.wikipedia.org/wiki/Dormancy), and [reproductive](http://en.wikipedia.org/wiki/Reproductive) control. |
| **11. Course objective:**This course aims to acquire the student the practical skills which are related to the theoretical part of the plant physiology course, in which aims to: * Introduce students to the importance of plant physiology and why it needs to be studied.
* Enable students to understand the importance of every physiological process that happens in the plant body.
* Make students be able to provide reasons for studying plant physiology.
* Make students capable of understanding how plant grow, from seed germination till maturity and what are the physiological processes that happen during plant growth.

Do tests as required for the lesson for understanding the physiological phenomenon that happen in plant body. |
| **12. Student's obligation**The student must attend the Laboratory and prepare for the tests or experiment tests in the lab, make assignment reports, and quizzes. |
| **13. Forms of teaching**Laptop is used to explain the lecturers, using the power point. Microscope also used sometime.  |
| **14. Assessment scheme**Grading: This subject includes practical part

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| --- | --- | --- | --- | --- | --- | --- |
| practical part | First exam | Second exam | Quiz, activity and report | Total quest | Final exam |  Total |
| degree | 5 | 5 | 5 | 15 | 20 | 35 |
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| **15. Student learning outcome:**The students will be exposed to the forest trees physiology and their benefits and the relationship with the forest and now they are adapted with the environment and their movement for survival and protection from.  |
| **16. Course Reading List and References‌:**1. Witman, Francis H., David F. Blaydes & Robert M. Devlin (1971), Experiments in plant physiology, VAN NOSTRAND REINHOLD COMPANY.
2. - Internet websites: using the following key words:
3. - Practical plant physiology
4. - Laboratory experiments of plant physiology
5. - Or any key wards for each private subject.

 السعدي, حسين علي و عبدالله حمد الموسوي (1980), فسلجة النبات العملي, مطبعة جامعة البصرة.- (6 1. عبدول, كريم صالح و فؤاد منحر علكم(1988), فسلجة النبات العملي, جامعة صلاح الدين/ كلية التربية -(7
 |
| **17. The Topics:** | **Lecturer's name** |
| None |  |
| **18. Practical Topics (If there is any)**  |  |
| **Solutions, Suspensions and Emulsions**Exp. 1: Preparation of true solutions Exp. 2: Preparation of Suspension and emulsions.Exp. 3: Preparation of colloidal solutions. | **Hardy K. Awlla****(3 hrs)** |
| **The characteristics of colloidal molecules (Colloidal systems) proofing the characteristics through lab experiments:**Exp. 1: Tyndall phenomenon.Exp. 2: Proving the presence of electric charges on colloidal molecules.Exp. 3: Adsorption.Exp. 4: Viscosity. Exp. 5: Precipitation of lyophobic colloids.Exp. 6: Brownian movement | **Hardy K. Awlla** **(6 hrs.)** |
| **Preparation of Solutions (Molarity, Molality and Normality)**Exp. (1): Practice about preparing molar solutions, with calculating examples about Molar (M) solutions.Exp. (2): Practice about preparing normal solutions, with calculating examples about Normal (N) solutions. | **Hardy K. Awlla****(3 hrs.)** |
| **Preparation of Solutions: (Percent Concentration % and Parts per million solutions ppm), for fertilizers, mineral nutrients and plant hormones.**Exp. (1): Practice about preparing types of percent concentrations %, with calculating examples about it.Exp. (2): Practice about preparing part per million solutions (ppm), with calculating examples about it.Exp. (3): Practice about preparing dilutions of different kinds of solutions, with calculating examples about it. | **Hardy K. Awlla** **(3 hrs)** |
| **Examination paper 1 (pending confirmation)** |  |
| **Diffusion (Study the process of diffusion and some of the factors which influence this phenomenon).**Exp. (1): Simple Diffusion of Gases.Exp. (2): Diffusion of solid Material in Liquids.Exp. (3): Diffusion of solid materials through solid mediumExp. (4): Diffusion of LiquidsExp. (5): The effect of particle size on the diffusion: "The diffusion of I2 and starch from the solid membrane of gelatin"Exp. (6): The rate of diffusion of any substance through semi permeable membrane depends on the size of particle. | **Hardy K. Awlla** **(6 hrs)** |
| **OSMOSIS**Exp. (1): Clarify Osmosis (using potato tubers).Exp. (2): Clarify Osmosis by the measurement of tissues weight.Exp. (3): Determining the water potential of plant tissues (the water potential of the cell at a concentration which no changes appear in the shape of the curve)Exp. (4): Determining the water potential of cells by plasmolysis**.** | **Hardy K. Awlla** **(6 hrs)** |
| **Permeability**Exp. 1: some physical factors affecting the permeability of plasma membrane (high, moderate and freezing temperature).Exp. 2: the effect of some chemical agents on the permeability of plasma membrane (acids, alkaloids and some organic compounds like ether or benzene). | **Hardy K. Awlla** **(3 hrs)** |
| **Imbibitions** Exp. 1: the change of weight and volume after imbibitions.Exp. 2: the production of thermal energy during imbibitions.Exp. 3: the pressure force that produced from imbibitions**.** | **Hardy K. Awlla** **(3 hrs)** |
| **Transpiration** Exp. 1: Proofing the presence of stomata on leaf surface using hot water.Exp. 2: Comparing the rate of stomatal and cuticular transpiration by four leaves method.Exp. 3: observing the water produced during transpiration using cobalt chloride papers. | **Hardy K. Awlla** **(3 hrs)** |
| **Examination paper 2 (pending confirmation)** |  |
| **Photosynthesis**(1): Experiments to show factors affecting Photosynthesis * The effect of light
* The effect of carbon dioxide
* The effect of chlorophyll

(2): Determination the amount of chlorophyll a and b, using spectrophotometer. | **Hardy K. Awlla** **(3 hrs)** |
| **Plant Growth Regulators** Experiment about foliar application of a Plant Hormone (Gibberellin). | **Hardy K. Awlla** **(3 hrs)** |
| **Mineral Nutrition in plants**Experiment about soil fertilization of a mineral nutrient (phosphorus).Experiment about foliar application of a Plant Hormone (Gibberellin). | **Hardy K. Awlla** **(3 hrs)** |
| **19. Examinations:**1. **Define Adsorption.**

***Adsorption*:** Adsorption is the adhesion of molecules of gas, liquid, or dissolved solids to a surface. This process creates a film of the adsorbate (the molecules or atoms being accumulated) on the surface of the adsorbent.2. Plasmolysis has two types, which are: ----------------and ------------------.**Answer**: temporal and permanent.**Compositional:** In this type of exam the questions usually starts with Explain how, What **are the differences between true solution, suspensions and colloids.****Answer:**

| **Property** | **True solutions** | **Colloidal solutions** | **Suspensions** |
| --- | --- | --- | --- |
| **Particle size** | **Less than 10-7 cm** | **Between 10-7cm and 10-5cm** | **Greater than** **10-5cm** |
| **Visibility of particles** | **Invisible to naked eye not visible under powerful microscope** | **Invisible to naked eye. Visible under powerful microscope** | **Easily visible** |
| **Sedimentation of particles** | **Do not settle down** | **Settle down under high centrifugation** | **Settle down due to gravity** |
| **Filtration through filter paper** | **No residue is formed** | **No residue is formed** | **Residue is formed** |

**Q/ Why the blue-purple layers don’t form when a starch solution will be added to the gelatin membrane that contains iodine solution? (Write the reason behind).****Answer:** because the starch particles have large sizes which can’t penetrates the small pores of gelatin and interact with iodine to give a blue-purple color. |
| **20. Extra notes:**The course needs labs in future. |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ**  |