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**Departments: Basic Science**

**College of Agricultural Engineering Sciences**

**Salahaddin University - Erbil**

**Subject: Theoretical General Botany**

**Course Book – year 1 (All groups)**

**Lecturer's name: Dr. Vian Dler Ali**

**Academic Year: 2022-2023**

**Course Book**

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| **1. Course name** | Theoretical G. Botany / spring semester |
| **2. Lecturer in charge** | Vian Dler Ali |
| **3. Department/ College** | Horticulture / Agricultural Engineering Sciences |
| **4. Contact** | e-mail: vian.ali1@su.edu.krd  |
| **5. Time (in hours) per week**  | Theoretical: (4) hours for two groups  |
| **6. Office hours** |  |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **Vian Dler Ali:** I have got my B.Sc. at salahaddin University – Agricultural engineering science college – plant production Department in 2006; I have got M.Sc. at Salahaddin University – Agricultural engineering science college – Forestry and Horticulture department in 2010. I have got Ph.D. in Ecological Physiology at Salahaddin University – Agricultural engineering science college – Field Crop and Medicinal department in 2023. Nowadays I am working as Lecturer in Department Horticulture- Agricultural engineering science College. |
| **9. Keywords** |  |
| **10. Course overview:** Plant Science is an introduction to the morphology, evolution, and classification of land plants. The objective is to present a foundation of the approach, methods, research goals, evidence, and terminology of plant systematics and to summarize information on the most recent knowledge of evolutionary relationships of plants as well as practical information vital to the field. Systematics, gives a general overview of the concepts and methods of the field of systematics. An introduction to the definition, relationships, classification, and importance of plants and summarizes the basic concepts and principles of systematics, taxonomy, evolution, and phylogeny must be involved. Evolution and Diversity of Plants, describes the characteristics and classification of plants. The beginning student may be given a basic understanding of the evolution of Green and Land Plants, Vascular Plants, Woody and Seed Plants, and Flowering Plants evolutionary approach to plant systematics makes learning the major plant groups and their features conceptually. The student may learn to recognize and know the basic features of the major lineages of plants, diagnostic features that a student might use to recognize a plant family, and some economically important uses of family members. Plant collecting and documentation emphasizes both correct techniques for collecting plants and thorough data acquisition, the latter of which has become increasingly important today in biodiversity studies and conservation biology. Information on herbaria and data information systems reviews the basics of herbarium management, emphasizing the role of computerized database systems in plant collections for analyzing and synthesizing morphological, ecological, and biogeographic data. A list of characters used for detailed plant descriptions may give, this list is useful in training students to write descriptions suitable for publication. Students need to learn to draw, in order to develop their observational skills. Finally, I would like to propose that each of us, instructors and students, pause occasionally to evaluate why it is that we do what we do, this offer these suggestions as possible goals: 1- to realize and explore the beauty, grandeur, and intricacy of nature; 2- to engage in the excitement of scientific discovery; 3- to experience and share the joy of learning.  |
| **11. Course objective:**After completing the course, students should be able to: 1. State, define, and give examples of the components of Plant group identification. 2. Describe a plant, using the descriptive terminology of plant groups, plant morphology, plant anatomy, embryology, and reproductive biology. 3. Fundamental of plant comprising organs. 4. Collect (including properly recording field data), identify, and process a plant for a herbarium specimen. 5. State the principles and rules of plant nomenclature, including how to apply botanical names. Students will be assessed for the above skills with quizzes, exercises, lecture exams, lab practical's. |
| **12. Student's obligation**The role of students and their obligations throughout the academic year involve theirattendance in the lectures, drawing all the plates and plant specimens concerning to the lecture, and completion of all daily (quizzes) and monthly tests, exams, and preparing some herbarial plant specimens. |
| **13. Forms of teaching**Different forms of teaching will be used to reach the objectives of the course: definitions, discussions and conclusions, plates and shapes by using Data-show (in power point) as well as using the white board to illustrate the lecture or sides of the lecture for the students. |
| **14. Assessment scheme**Every the daily (quizzes) tests given 10 marks and finally calculated as a monthly test (100 marks) in addition to the monthly tests (1-2 tests), all these marks calculated as the course attempt mark, as well as additional marks will be given to the students whom bringing fresh plant specimens. ‌ |
| **15. Student learning outcome:**The objective of the course is to present a foundation of the approach, methods, research goals, evidence, and terminology of plant systematics and to summarize information on the most recent knowledge of evolutionary relationships of plants as well as practical information vital to the field. The student may learn to recognize and know the basic features of the major lineages of plants, diagnostic features that a student might use to recognize a plant family, and some economically important uses of family members. When the student be able to recognize and identify the plant specimens he will be able to work in the herbaria, preparing the Floras, national parks, botanical gardens, as well as preparing the scientific researches.  |
| **16. Course Reading List and References‌:**1. Ajithadoss K., Renu edwin, T. Sekar, Thiru. P. Sankar and Thiru. S. Munusamy (2006). BIOLOGY BOTANY Higher Secondary Second Year. Government of Tamil Nadu, Tamil Nadu.
2. Al-Rawi, A. (1964). Wild plants of Iraq with their distribution. Ministry of Agriculture & Irrigation, state board for agricultural & water resources research, National Herbarium of Iraq, Baghdad.
3. Al-Rawi, A. and H. L. Chakravarty (1988). Medicinal plants of Iraq. Second edition. Ministry of Agriculture & Irrigation, state board for agricultural & water resources research, National Herbarium of Iraq, Baghdad.
4. Al-Rawi, A. (1988). Poisonous plants of Iraq with. Third edition. Ministry of Agriculture & Irrigation, state board for agricultural & water resources research, National Herbarium of Iraq, Baghdad.
5. Barrett, S. C. H. (Ed.) 2008. Major evolutionary transitions in flowering plant reproduction. Chicago, IL: University of Chicago Press.
6. Glimn-Lacy, J & Peter B. Kaufman. (2006). Botany Illustrated. 2nd edition, Printed in the United States of America, University of Michigan, USA.
7. Guest, E. (1966). Flora of Iraq. Vol. 1. Ministry of Agriculture of Iraq.
8. Harder, L. D., and S. C. H. Barrett. 2007. The ecology and evolution of flowers. New York: Oxford University Press.
9. Lawrence, G. H. M. (1951). Taxonomy of Vascular Plants. The Macmillan Publishing Co., INC. New York.
10. McDonald, M. B., and F. Y. Kwong (Eds.). 2005. Flower seeds: Biology and Technology. Cambridge, MA: CABI Publishing.
11. Overview Some Learning Goals (Botany Chapter 3 The Cell) Plant Sciences Inquiry: Microscapes Higher Plant Cells versus Animal Cells Summary Review Questions Discussion Questions Additional Reading. <http://www.mhhe.com/stern12e> Learning Online.
12. Pandey, S. A. and S. P. Misra (2008). Taxonomy of Angiosperms. New Delhi, India.
13. Radford, A. E., Dickson, W. C., Massey, J. R. and Bell, C. R. (1974). Vascular Plant systematic. Harper and Row, New York.
14. Rudall J. P. (2007). Anatomy of Flowering Plants an Introduction to Structure and Development Cambridge University Press. The Edinburgh Building, Cambridge CB2 8RU, UK Published in the United States of America by Cambridge University Press, New York.
15. Simpson M. G. (2006), Plant systematics, Elsevier academic press, Oxford, UK.
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| **17. The Topics:** | **Lecturer's name** |
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| **18. Theoretical Topics (If there is any)** | **Lecturer's name** |
| Week 1: Course Book Illustration and GlossaryWeek 2: Introduction to G. Botany * Botany definition
* History of botany
1. Morphology
2. Anatomy
3. Taxonomy (Cryptogams (Non-Flowering Plants): 2. Spermatophyta (Seed Plants) 3. Gymnosperms (Naked Seed Plants) 4. Angiosperms (Flowering Plants); Monocots and Dicots.
4. Cytology
5. Embryology
6. Genetics
7. Evolution
8. . Paleontology
9. . Physiology
10. Ecology
* Scopes of botany1-Economic botany, Forestry , Horticulture Plant Pathology, Plant breeding, Pharmacognosy.
* Importance of plants to life

Week 3: **Plant cell*** cell wall layers ,structure and its function
* The protoplast-**Living component**
* Plasma membrane
* Nucleus
* Ribosome
* Plastids
* Mitochondria
* Peroxisome
* Endoplasmic Reticulum
* Golgi apparatus
* The protoplast-**Non -Living component**
* Vacuole , Ergastic substances ( carbohydrate, Protein and fats )

Week 4: **Cell Division*** Chromosome structure
* cell cycle
* *G0,G1*, *S* and *G2* phases
* Mitosis (mitotic) phase
* Meiosis

Week 5: **First Exam**Week 6: **Plant tissue** * Meristematic tissues

a) Primary meristematic tissues  b) Secondary meristematic tissues * Permanent tissues

1) Ground or fundamental tissue systems. 2) The vascular tissue system. 3) The dermal tissue system.Week 7: **Root system*** -Function of the roots
* -Types of roots

 \*Primary roots  \*Adventitious roots* Root anatomy
* The vascular cylinder
* The cortex
* The epidermis
* Differences between Monocot and Dicot roots

Week 8: **Shoot system** (Stems and Leaves)***\**The Stem**  -The function of the stems -Type of stems -The buds -Stem secondary growth -Differences between Monocot and Dicot StemsWeek 9: **Leaves** (origin - composition - function - leaf arrangement system on the stem - leaf modifications - types of leaves found in the plant and Leaf anatomyWeek 10: **Second Exam**Week 11: **The Flower** Flower and inflorescence definition - origin - function - structure - types of flowers and inflorescencesWeek 12: **The fruit** - Fruit development, Parthenocarpic fruits, Fruit classificationWeek 13: **The seeds**Seed types, Seed forming, Seed structure The Different between seed monocot and dicotWeek 14: **Environmental Factors Affecting Plant Growth**; Light - Quality, Quantity and Duration; Short day length plants; Long day plants; Day neutral plants flower; Temperature; Thermoperiod; Breaking dormancy - cold period; Plants in Communities | Dr. SerwanTaha Al-dabbaghThe theoretical lecture takes 2 hrs. And Every practical lecture takes 3 hrs. |
| **19. Examinations: (Theoretical Type Questions):** **Q1/Fill the following blanks with appropriate phrases:**1. Botany is ----------------.
2. The plant cell typically consists of --------------and ---------------.
3. Aleuronic grains may be ----------- or ---------- and ------------.
4. Ribosomes are small particles that occur free in ---------, on the outside of the -------- and in the ----------.
5. Vacuole occupy more than ----------- of the volume of most mature plant cells.
6. Permanent tissue consists of ------------------ and ------------------.
7. Parenchyma tissue divided on the basis of function to ------------------------, -------------------- and -------------------.
8. There are three types of collenchyma ------------------, ------------------- and ----------------.
9. Lenticels are ----------------------------------------------------------------------.
10. Some taproots are modified for food storage as -----------------------------

 ***Q2*/ Enumerate only:** 1. Non-living components.
2. Types of plastids.
3. Types of pits.
4. Types of roots
5. Types of vessels.

***Q3*/ Write the functions of the following:**  1- Mitochondria.1. Peroxisomes.
2. Golgi apparatus.
3. Cytoplasm.
4. Types of roots
5. Types of vessels.

***Q4*/A/ Write the differences between the following:** 1. Gymnosperms and Angiosperm.
2. Monocots and Dicots.
3. Tap root and Fibrous root.

**Q4/** **Write appropriate phrases in the following square blanks:** **Q4/ B- / Check the correct choices:** 1. Sclerenchyma consist of …………………  a- Fibres and sclerides b- Palisade and spongy c- Vessels and tracheids 2. Stomata apparatus consist of ………………………… a- Root hair b- Guard cell c- Epidermis3. Calyptrogen forms the …………………. a- Apical meristem b- protoderm c- Root cap (Calyptra) 4. Vascular System consist of . ……………….. a- xylem and phloem b- Vessels and tracheids c- Fibres and sclerides 5. The first shoot of a seed plant develops from the ……………….. a- Hypocotyl b- Epicotyl c-Cotyledon |
| **20. Extra notes:** |
| **21. Peer review** |