



University of Salahaddin- Erbil

College of Agriculture Engineering Sciences

Departments: Horticulture.

Subject: Plant Taxonomy (Practica)

Course Book – Year 2

Lecturer's name: Dr. Ali Mala Khedir Galalaey and Assist.

Lect. Narmin Azeez Saeed

Academic Year: 2023/2024

Course Book

1. Course name	Theoretical and Practical Plant Taxonomy
2. Lecturer in charge	Ali Mala Khedir Galalaey Theoretical Narmin Azeez Saeed Practical
3. Department/ College	Field Crops / Agricultural Engineering Sciences
4. Contact	e-mail: ali.galalaey@su.edu.krd Tel: (0750 4556045)
5. Time (in hours) per week	Theoretical: (2) + Practical: (3) hours
6. Office hours	
7. Course code	
8. Teacher's academic profile	There is no doubt that the teacher as a main factor of the teaching process, has a very good and important role in performance the teaching program and preparing the students, he is the follower of the results of teaching process and try to progress this process. The teacher is an affected factor among the teaching factors, and has effect on the student's characters and their future, therefor; the teacher must beware in his treatment with the students and the teaching staff. For all the progress that take place in the world, in all the fields, such as cultural, social, scientific, technology, etc. ... , the teacher must suit himself with all these changes and benefit from them in order he can finally to reach these benefits to all peoples that he treat with them.
9. Keywords	
10. Course overview:	Plant Systematics 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 taxonomy: description, identification, nomenclature, and classification.
2. Describe a plant, using the descriptive terminology of plant morphology, anatomy, embryology, palynology, and reproductive biology.
3. Name, classify, and diagnose several of the major families of flowering plants.
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 their attendance 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.

Laboratory Notebook

Students will need to keep a laboratory notebook for the duration of the course. This notebook should contain illustrations that you make during lab, primarily those that are listed for you to draw in the laboratory exercises. The notebook may be of two possible formats: a bound lab notebook, available at the bookstore, or 3-hole punched white paper, placed in a separate 3-ring notebook. I will evaluate your drawings early in the semester (after the first week or two) to give you suggestions. The laboratory notebook is due (counts as a quiz) during the semester.

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/ she will be able to work in the herbaria, preparing the Floras, national parks, botanical gardens, as well as preparing the scientific researches. The student will learn from Plant Taxonomy and all its subjects that: to realize and explore the beauty, grandeur, and intricacy of nature; to engage in the excitement of scientific discovery; and to experience and share the joy of learning.

16. Course Reading List and References:

1. 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.
2. 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.
3. 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.
4. Glimn-Lacy, J & Peter B. Kaufman. (2006). Botany Illustrated. 2nd edition, Printed in the United States of America, University of Michigan, USA.
5. Guest, E. (1966). Flora of Iraq. Vol. 1. Ministry of Agriculture of Iraq.
6. Lawrence, G. H. M. (1951). Taxonomy of Vascular Plants. The Macmillan Publishing Co., INC. New York.
7. Pandey, S. A. and S. P. Misra (2008). Taxonomy of Angiosperms. New Delhi, India.
8. Radford, A. E., Dickson, W. C., Massey, J. R. and Bell, C. R. (1974). Vascular Plant systematic. Harper and Row, New York.
9. Simpson M. G. (2006), Plant systematics, Elsevier academic press, Oxford, UK.
10. الموسوي ، علي حسين (1987). علم تصنيف النبات . وزارة التعليم العالي و البحث العلمي ، جامعة بغداد ، مطابع جامعة الموصل جمهورية العراق .
11. - تصنيف النباتات البذرية: يوسف منصور الكاتب.

17. The Topics:	Lecturer's name
18. Theoretical and Practical Topics (If there is any)	Lecturer's name
<p>A-Theoretical Topics</p> <p>Weekl: Fundamental Components of Taxonomy,</p> <p>International Code of Botanical Nomenclature. (I.C.B.N.):</p>	<p>The theoretical lecture takes 2 hrs. And Every practical lecture takes 3 hrs.</p>

<p>Week2: Historical Retrospect</p> <ol style="list-style-type: none">1. Early History of Plant Taxonomy2. Later Progress in Plant Taxonomy3. Recent Systems of Classification <p>Week3: Modern Trends or Scope of Plant Taxonomy</p> <ol style="list-style-type: none">1. Anatomy2. Palynology3. Embryology4. Cytology5. Chemotaxonomy6. Numerical Taxonomy <p>Week4: Plant Morphology</p> <p>ROOT: Origin of roots. Root system. Modified Roots STEM: Origin of stem. Part of a stem.</p> <ol style="list-style-type: none">1. Monopodial and Sympodial system of branching.2. Stem habit types .3. Modified stems <p>Week 5:LEAF: Origin of leaf</p> <ol style="list-style-type: none">1. Phyllotaxy.2. Leaf incision (simple & compound leaves).3. Leaf parts (of foliage leaves).4. Venation <p>Week6: BRACT and BRACTEOLS:</p> <ol style="list-style-type: none">1. Types of bracts2. Specialized bracts <p>Week7:FLOWER: Flower parts, Type of perianthcycly,</p> <ol style="list-style-type: none">1. Calyx, Number of sepals Some modiflicated shapes of calyx,2. Corolla, Number of petals, Gamopetalous or Synpetalous shapes. <p>Week8: FLOWER SYMMETRY and APPENDAGES</p> <p>Week9:ANDROECIUM:</p> <p>Stamen Arrangement, Cycly, and Position. Stamen Attachment.</p> <p>Nectaries, Stamen fusion, Anthers parts, Type, and Attachment. Anthers dehiscence. Pollen grain, Pollen unite, Pollen polarity.</p> <p>Week10:GYNOECIUM, (Carpels, and Pistil):</p> <p>Carpel number, Ovary position, Placentation,</p> <p>Week11:INFLORESCENCE;</p> <p>Inflorescence parts, Inflorescence type, Inflorescence development, Specialized inflorescences.</p> <p>Week12:FRUITS; Fruit types, Simple fruit types, Fleshy (succulent) Fruits, Simple dry at maturity, Aggregate fruit types, Multiple fruit types.</p>	
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<p>SEEDS; Seed endosperm type, Seed germination type, General Terminology, Color, Size, Shape,.Week13:PLANT IDENTIFICATION:</p> <p>Construction and Use of Keys, Types of keys:</p> <ol style="list-style-type: none">1) Indented or Yoked keys;2) Bracketed or Parallel keys:. <p>Week14:Some an important (Angiosperms) families;</p> <ol style="list-style-type: none">1. Aster Family (Asteraceae):2. Mustard Family (Brassicaceae):3. Nightshade Family (Solanaceae):4. Carrot Family (Apiaceae): <p>Week15:</p> <ol style="list-style-type: none">1. Grass Family (Poaceae):2. Lily Family (Liliaceae):3. Beech Family (Fagaceae):4. Iris Family (Iridaceae): <p>B- Practical Topics</p> <p>Week 1:</p> <p>Plant Morphology, ROOT: Origin of roots. Root system. Modified Roots.</p> <p>Week 2: STEM: Origin of stem. Part of a stem.</p> <ol style="list-style-type: none">1. Monopodial and Sympodial system of branching.2. Stem habit types .3. Modified stems <p>Week 3:</p> <p>LEAF: Origin of leaf</p> <ol style="list-style-type: none">1. Phyllotaxy.2. Leaf incision (simple & compound leaves). <p>Week 4:</p> <ol style="list-style-type: none">3. Leaf parts (of foliage leaves).4. Venation <p>Week 5: BRACT and BRACTEOLS:</p> <ol style="list-style-type: none">1. Types of bracts2. Specialized bracts <p>Week 6:FLOWER: Flower parts, Type of perianthcycly,</p> <p>Calyx, Number of sepals Some modiflicated shapes of calyx,</p> <p>Week 7:</p> <p>Corolla, Number of petals, Gamopetalous or Synpetalous shapes.</p> <p>Week 8: FLOWER SYMMETRY and APPENDAGESWeek 9:ANDROECIUM:</p>	
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<p>Stamen Arrangement, Cycly, and Position. Stamen Attachment.</p> <p>Nectaries, Stamen fusion, Anthers parts, Type, and Attachment. Anthers dehiscence. Pollen grain, Pollen unite, Pollen polarity.</p> <p>Week 10:GYNOECIUM, (Carpels, and Pistil):</p> <p>Carpel number, Ovary position, Placentation,Week 11:INFLORESCENCE;</p> <p>Inflorescence parts, Inflorescence type, Inflorescence development, Specialized inflorescences.</p> <p>Week 12:FRUITS; Fruit types, Simple fruit types, Fleshy (succulent) Fruits, Simple dry at maturity, Aggregate fruit types, Multiple fruit types.</p> <p>Week 13:</p> <p>SEEDS; Seed endosperm type, Seed germination type, General Terminology, Color, Size, Shape,.</p> <p>Week 14:</p> <p>PLANT IDENTIFICATION:</p> <p>Construction and Use of Keys, Types of keys:</p> <ol style="list-style-type: none"> 1) Indented or Yoked keys; 2) Bracketed or Parallel keys:. <p>Week 15:Some samples of an important (Angiosperms) families;</p> <ol style="list-style-type: none"> 1. Aster Family (Asteraceae): 2. Mustard Family (Brassicaceae): 3. Nightshade Family (Solanaceae): 4. Carrot Family (Apiaceae): 5. Grass Family (Poaceae): 6. Lily Family (Liliaceae): 7. Beech Family (Fagaceae): 8. Iris Family (Iridaceae): 	
<p>19. Examinations:(Theoretical):</p> <p>Q1/Fill the blanks with missing words: (---- Marks)</p> <ol style="list-style-type: none"> 1. Subterranean stem have different shapes, ----- , ----- , ----- and ----- . 2. Fleshy taproot classified according to outer shape to: ----- , ----- ----- , ----- , ----- , -----. 3. Gamopetalous and regular corolla is in different shapes, ----- , ----- ----- , ----- , ----- , ----- . 4. First class in Linnaeus system is ----- , and class 24 is----- . 	

5. The abbreviation of **ICBN** mean- - - - - .

Q2/ A-Choose the correct answer for the following sentences:

(----- Marks)

1. The modern approaches in Plant Taxonomy system were :
a- Phylogenetic system b- Artificial system c- Natural system
2. The modification root for physical function is:
a- Mycorrhiza root b- Contractile root c- Tuberos root
3. If the parts of the flower are separate from each other in same series called:
a- Connation b- Adnation c- Distinct
4. When the filament free and anthers united to form one bundel called:
a- Synandrous b- Adelphy c-Syngenesious
5. Leafless flowering stem called:
a- a caudex stem b- a scape stem c- ascending stem

B- List only:

(----- Marks)

- 1) Period of history of classification.
- 2) Anther dehiscence.

Q3/ A- Put the sign (✓) in front of correct sentences and sign (X) in front of incorrect sentences :
(-----Marks)

1. Palenology include the study of terrestrial plant fossils.
2. Vegetative characters are taxonomically more important than reproductive.
3. *Solanum tuberosum* L., the L. refers for Linnaeus who observed and reported the plant.
4. Hermaphrodite flower is unisexual flower.
5. Chemical characters are used to distinguish hybrids taxa.

B-Define the following:

(---- Marks)

1. Chemotaxonomy.
2. Spur.
3. Bract.

Q4/ A- Rearrange the words written under the column B with the most appropriate ones in meaning written under the column A.: (---- Marks)

A	B
() Phylogenetic	1. Jon Ray
() Herbae and arborate	2. Gynoecium
() Stem	3. <i>Papaver</i> sp.
() Blade	4. Lamina
() Intermittent corolla tube	5. Angler
() Carpel	6. Plumule
() Asymmetrical	7. <i>Canna indica</i>
() Caducous calyx	8. <i>Nerium oleander</i> L.
() Synpetalous	9. Bract
() Spathe	10. Bessey
	11. <i>Rosa canina</i>
	12. Gamopetalous
<p>B- Diagram the following with pointing its parts: (---- Marks)</p> <ol style="list-style-type: none"> Hypogynous flower. Impari-Bipinnately compound leaf. Explain syncarpous in flower. (----- Marks) 	
<p style="text-align: center;">Answers</p>	
<p>Q1/</p>	
<p>1. Rhizome, Tubers, Bulbs, Corms.</p>	
<p>2. Conical, Fusiform, Napiform, Root tubers, Globform.</p>	
<p>3. Campanulate, Funnel form, Salver form, Rotate, Tubuler.</p>	
<p>4. Monandria, Cryptogamia.</p>	
<p>5. International Code of Botanical Nomenclature.</p>	
<p>Q2/ A- 1-a 2-a 3-c 4-c 5-b</p>	

Q2/ B-

1)

1. Early History of Plant Taxonomy
2. Later Progress in Plant Taxonomy
 - a- Artificial or Sexual Systems
 - b- Natural Systems
3. Modern Approaches in Plant Taxonomy;
Phylogenetic Systems
4. Recent Systems of Classification

2)

Q3/ A-

1. X 2. X 3. ✓ 4. X 5. X

Q3/ B-

1. Chemotaxonomy: The application of chemistry to systematics is called chemotaxonomy or chemical taxonomy
2. Spur: a tubular, rounded or pointed projection from the corolla, functioning to contain nectar (nectar pouch), as in *Delphinium*, or with enlarged saclike petal as in *Fumaria* and *Antirrhinum*.
3. Bract: Axillary floral buds are usually born in the axils of the specialized leaves called **bracts**.

Q4/ A-

- | | |
|-------|--------|
| 1. 11 | 6. 3 |
| 2. 1 | 7. 8 |
| 3. 7 | 8. 4 |
| 4. 5 | 9. 13 |
| 5. 9 | 10. 10 |

Q4/ B-

Examinations(Practical – by move):

Q1/Identify the following parts:

- A- Modified root ? Fasciculate roots.
- B- Leaf shape? Linear.
- C- Leaf venation? Palmately parallel.
- D- Inflorescence ? Panicle.

20. Extra notes:

21. Peer review

I reviewed this course book and I approve its contents.

Signature:

Name: Assist. Prof. Dr. Serwan Taha Al-Dabbagh



