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**Department of Biology**

**College of Science**

**University of Salahaddin**

**Subject: Plant Anatomy Theory**

**Course Book – (2nd year general biology)**

**Lecturer's name:**

 **Assis.Prof.Dr. Shireen Abdulkarim Amin**

* **Practical anatomy and taxonomy**

**Lecturer: - Bnar Khalid Bakr**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Plant anatomy** |
| **2. Lecturer in charge** | **Dr.Shireen Abdulkarim Amin** |
| **3. Department/ College** | **Biology / science** |
| **4. Contact** | **e-mail:** shireen.amin@su.edu.krd**Tel: (optional)** |
| **5. Time (in hours) per week**  | **For example Theory: 2** **Practical: 6**  |
| **6. Office hours** | **To be Return to the schedule on the office door** |
| **7. Course code** | **254** |
| **8. Teacher's academic profile**  | * **I was graduated in the College of Education University of Salahaddin (Ranked 4th in the collage). In 1999 and obtained my MSc degree in Plant Physiology in the College of Education University of Salahaddin in 2002.**
* **My first employment was in 2002 as Assistant Lecturer in the College of Science/ University of Salahaddin.**
* **In 2002 I taught practical plant anatomy and practical botany in College of Science / University of Salahaddin.**
* **In 2003 I taught practical plant physiology in the college of Science / University of Salahaddin.**
* **In 2003 I started for PhD in Almustansiriyah University and got the degree in plant tissue culture in 2007.**
* **Between 2007-2008 I taught plant anatomy and taxonomy theory and supervised Practical anatomy and taxonomy Laboratory in the College of Science University of Salahadin.**
* **Since 2008 I teach plant taxonomy and plant anatomy till now.**
* **A Member of the Examination Committee for College of Science in 2009.**
* **I have 9 published researches in my field.**
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| **9. Keywords** | **Plant cell ,tissue ,organs and difference in anatomical structures between dicot and monocot plant and the anatomy of plant to its environment.** |
| **10. Course overview:** In this section the lecturer shall write an overview about the subject he/she is giving. The course overview must cover:▪ The importance of studying the subject▪ Understanding of the fundamental concepts of the course▪ Principles and theories of the course▪ A sound knowledge of the major areas of the subject▪ Sufficient knowledge and understanding to secure employmentThis should not be less than 200 words  |
| **11. Course objective:****The course is comprised of lectures, discussions, laboratories, guided and independent investigations, and presentations. The focus of the course is on the anatomy and functional morphology of photosynthetic organisms in both aquatic and terrestrial systems. The primary objective of the course is to gain an understanding of the internal structure of vascular plants. The emphasis will be on the angiosperms (flowering plants) but consideration of certain features of gymnosperms and lower vascular plants will be made where appropriate for comparison. Further objectives are to discuss the functional significance of plant structure as much as possible and to consider the development and phylogeny of the plant tissues and organs. Because complete interpretation of plant function, classification, ecology, etc. depends on a good basic understanding of plant structure, plant anatomy is important to all areas of botany.** |
| **12. Student's obligation****\*Exam policy: Student Should take 2 exam during the course. \*Classroom polices:****1- Attendance: You are strongly encouraged to attend class on a regular basis, as participation is important to your understanding of the material. This is your opportunity to ask questions. Regular and punctual attendance is each student’s responsibility. Although I may not take roll at every class meeting, I do keep a record of your general attendance behavior. Because class participation does have a bearing on your grade, it is important not to cut class. If you must miss a class, please contact me as soon as possible to find out how to make up the work.****According to University policy “students must attend a minimum of 75 percent of all scheduled classes****2- Lateness: Lateness to class is disruptive****3- Electronic devices: All cell phones are to be turned off at the beginning of class and put away during the entire class.****4-Talking : During class please refrain from side conversations. These can be disruptive to your fellow students and your professor****5- No Disrespectful to both the professor and to your fellow students.**  |
| **13. Forms of teaching ; Course Book and PowerPoint** |
| **14. Assessment scheme**

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| --- | --- | --- |
| **Component** | **Date** | **Percent** |
| **Exam1** | **--/--/2015** | **40 %** |
| **Exam 2** | **--/--/2015** | **40 %** |
| **Respecting Classroom Policy**  |  | **20%** |
| **Total** |  | **100%** |

**Mean of two examinations: 15%**  **Practical Examination 35%** **Final examination only theory: 50 %** |
| **15. Student learning outcome: After completion of this course, you will be able to:*** **Understand the morphology and anatomy of plants at the cell, tissue and organ levels**
* **Recognize and be able to describe features of plant anatomy at the cell, tissue and organ levels**
* **Use microscopy tools to investigate cell and tissue features of plants**
* **Critically read literature in the field of plant anatomy and morphology**
* **Apply research skills, both to literature reviews and in independent investigations**
* **differentiate between the basic systematic groups of vascular plants: gymnosperms, and angiosperms.**
* **understand the hierarchy of plant structure by learning the basic features of plant cells, tissues, and organs.**
* **relate the structure of particular types of cells and tissues to their functions.**
* **compare structural differences among different taxa of vascular plants.**
* **interpret the basic pattern of plant growth from different kinds of meristems and understand the relationships between primary growth and secondary growth.**
* **appreciate the complexity of the seed plant life cycle and understand the structure of the parts that are involved in the various stages of reproduction.**
* **describe some of the ways in which the structure of a plant part is related to survival in the kind of environment in which the plant lives.**
* **interpret some of the hypothesis explaining the phylogenetic development of certain cells, tissues, and organs.**
* **make connections between plant anatomy and the other major disciplines of biology, including taxonomy, cell biology, physiology, genetics, biochemistry, and ecology.**
 |
| **16. Course Reading List and References‌:****▪ Key references:****▪ Useful references:*** Sylvia, S. M. 1998. Biology. 6th edition. Mc Grow-Hill
* Ravindra, N. 2003. Principal of Modern Botany. New Delhi
* Bhattacharya, K; Hait, G. and Ghosh, A.K. 2007. A Text Book of Botany. New Central Book Agency (P) Ltd. New Delhi.
* edition. W.H. Freeman and Company Publishers. New York.
* Rudall, P.J. Anatomy of flowering plants.2007. Cambridge university press.

 Esau’s Plant anatomy : meristems, cells, and tissues of the plant body : their structure, function, and development / Ray F. Evert.—3rd ed.RUDALL , P.J. 2007.Anatomy of Flowering Plants An Introduction to Structure and Development .3rd edition. |
| **17. The Topics:** | **Lecturer's name** |
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| **Week1:**  |
| **Week 2** |
| **Week 3** |
| **Week 4** |
| **Week 5** |
| **Week 6** |
| **Week 7** |
| **Week 8** |
| **Week 9** |
| **Week 10** |
| **Week 11** |
| **Week 12** |
| **Week 13**  |
| **Week14** |

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| **Introduction to plant anatomy****Cell wall of plant**  |
| **meristematic tissues** |
| **stomata and trichomes** |
| **Ground tissue system, parenchyma,** |
| **collenchyma,sclerenchyma**  |
| **Xylem tissue** |
|  **Phloem tissue** |
| **Periderm** |
| **Secondary growth in stem** |
| **Secondary growth of root** |
| **Secretion in plant** |
| **Plant organs** |
| **Root** |
| **Stem****exam** |

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| **19. Examinations:****1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?****With their typical answers****Examples should be provided*** **Q1:- Define the following terms**
* **Sap wood, periderm, albuminous cell, sieve tube, pericycle (5 marks)**
* **Q2:- make differences between dicot stem and monocot stem? (2.5 marks)**
* **Q3/write only one function for each of the following terms? (5)**
* **Stomata, epidermis, cell wall, pits**
* **Plant Anatomy**
* **Q1/ Fill-up the blanks: - (15 marks)**
* **………………………..is secondary thickening on the radial and tangential walls of endodermal cells.**
* **…………………….is a process that initiate plant development that transforms a single celled zygote into embryo.**
* **…………………..are populations of small isodiametric cells with embryonic characteristics.**
* **In…………………..stomata the two guard cell surrounded by four or radially arranged subsidiary cells.**
* **……………..shape stomata found in gramineae family.**
* **………………is a dark region formed during the telophase stage.**
* **……………….is a region that is found immediately below the epidermis in the stem.**
* **……………..is a complex proteins may be involving in moving materials through the sieve tubes.**
* **…………………zone in the root is the region where completely functional cells are found.**
* **……………..refers to all tissues outside the vascular cambium the outer layers that cover stems and roots of woody plants.**
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**2. True or false type of exams:****In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided****3. Multiple choices:****In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.** |
| **20. Extra notes:**Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks. |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*ئه‌م کۆرسبووکه‌ ده‌بێت له‌لایه‌ن هاوه‌ڵێکی ئه‌کادیمیه‌وه‌ سه‌یر بکرێت و ناوه‌ڕۆکی بابه‌ته‌کانی کۆرسه‌که‌ په‌سه‌ند بکات و جه‌ند ووشه‌یه‌ک بنووسێت له‌سه‌ر شیاوی ناوه‌ڕۆکی کۆرسه‌که و واژووی له‌سه‌ر بکات.هاوه‌ڵ ئه‌و که‌سه‌یه‌ که‌ زانیاری هه‌بێت له‌سه‌ر کۆرسه‌که‌ و ده‌بیت پله‌ی زانستی له‌ مامۆستا که‌متر نه‌بێت.‌‌  |

**Department of Biology**

**College of Science**

**University of Salahaddin**

**Subject: Plant taxonomy theory**

**Course Book – (2nd year student -General Biology )**

**Lecturer's name:**

**Assis.Prof.Dr. Shireen Abdulkarim Amin**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Plant taxonomy** |
| **2. Lecturer in charge** |  |
| **3. Department/ College** | **Biology / science** |
| **4. Contact** | Shireen.amin@su.edu.krd |
| **5. Time (in hours) per week**  | **For example Theory: 2****Practical: 6**  |
| **6. Office hours** | **To be Return to the schedule on the office door** |
| **7. Course code** | **254** |
| **9. Keywords** | **Plant taxonomy, plant systematics, the flowers , type of roots, type of stems, the leaves.** |
| **10. Course overview:** In this section the lecturer shall write an overview about the subject he/she is giving. The course overview must cover:▪ The importance of studying the subject▪ Understanding of the fundamental concepts of the course▪ Principles and theories of the course▪ A sound knowledge of the major areas of the subject▪ Sufficient knowledge and understanding to secure employment |
| **11. Course objective:****The course is comprised of lectures, discussions, laboratories, guided and independent investigations, and presentations. The focus of the course is on the taxonomy and plant orang systematics. The primary objective of the course is understanding the important of taxonomy plants. The assurance will be on the type of root, vegetative parts and modification of these parts. Furthermore objectives are to discuss how classify the plants according to characteristics of the organs, the plant taxonomy is help the another disciplines of plant science.** |
| **12. Student's obligation****\*Exam policy: Student Should take 2 exam during the course. \*Classroom polices:****1- Attendance: You are strongly encouraged to attend class on a regular basis, as participation is important to your understanding of the material. This is your opportunity to ask questions. Regular and punctual attendance is each student’s responsibility. Although I may not take roll at every class meeting, I do keep a record of your general attendance behavior. Because class participation does have a bearing on your grade, it is important not to cut class. If you must miss a class, please contact me as soon as possible to find out how to make up the work.****According to University policy “students must attend a minimum of 75 percent of all scheduled classes****2- Lateness: Lateness to class is disruptive****3- Electronic devices: All cell phones are to be turned off at the beginning of class and put away during the entire class.****4-Talking: During class please refrain from side conversations. These can be disruptive to your fellow students and your professor****5- No Disrespectful to both the professor and to your fellow students.**  |
| **13. Forms of teaching ; Course Book and PowerPoint** |
| **14. Assessment scheme**

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| --- | --- | --- |
| **Component** | **Date** | **Percent** |
| **Exam1** | **--/--/2015** | **40 %** |
| **Exam 2** | **--/--/2015** | **40 %** |
| **Respecting Classroom Policy**  |  | **20%** |
| **Total** |  | **100%** |

**Mean of two examinations: 15%**  **Practical Examination 35%** **Final examination only theory: 50 %** |
| **15. Student learning outcome: After completion of this course, you will be able to:*** **Understand the classification of plants.**
* **Recognize and be able to describe features of plant morphology.**
* **Use microscopy tools to investigate the features of plants**
* **Critically read literature in the field of plant taxonomy.**
* **Apply research skills, both to literature reviews and in independent investigations**
* **Differentiate between the basic systematic groups of plants**
* **Compare among different taxa of plants by morphological characters.**
* **Describe some of the ways in which the classify the plants.**
 |
| **16. Course Reading List and References‌:****▪ Key references:****▪ Useful references:**1-Hutchinson, J. 1964. The Families of Flowering Plants. Oxford press. 2-Ravindra, N. 2003. Principal of Modern Botany. New Delhi 3-Wilson, C. L. and Loomis, W. E. 1967. Botany. 4th edition. 4-James, C.2006. Practical Plant Identification. Cambridge University Press. 5-Nels, R. L. 2004. Flowering Plant Embryology. Blackwell Publishing Ltd.**▪ Magazines and review (internet):** |
| **17. The Topics:** | **Lecturer's name** |
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| **Week:1** |
| **Week2** |
| **Week3** |
| **Week4** |
| **Week5** |
| **Week6** |
| **Week7** |
| **Week8** |
| **Week9** |
| **Week10** |
| **Week11** |
| **Week12** |
| **Week13****Week 14** |

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| Introduction to plant taxonomy, classification systems |
| Herbarium |
| **Flower** |
|  types of flower |
|  Androecium |
| gynoecium |
| fruits |
| pollination |
|  monocot family |
| dicot family |
| poisonous plants |
| **Root**  |
| **Stem****exam** |

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| **18. Practical Topics (If there is any)** |  |
| **19. Examinations:****1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?** |
| **20. Extra notes:**Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks. |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*ئه‌م کۆرسبووکه‌ ده‌بێت له‌لایه‌ن هاوه‌ڵێکی ئه‌کادیمیه‌وه‌ سه‌یر بکرێت و ناوه‌ڕۆکی بابه‌ته‌کانی کۆرسه‌که‌ په‌سه‌ند بکات و جه‌ند ووشه‌یه‌ک بنووسێت له‌سه‌ر شیاوی ناوه‌ڕۆکی کۆرسه‌که و واژووی له‌سه‌ر بکات.هاوه‌ڵ ئه‌و که‌سه‌یه‌ که‌ زانیاری هه‌بێت له‌سه‌ر کۆرسه‌که‌ و ده‌بیت پله‌ی زانستی له‌ مامۆستا که‌متر نه‌بێت.‌‌  |

 **Department of …Biology…..**

**College of ……Science…………………. University of ……Salahhadin…..**

**Subject: Plant Anatomy and Taxonomy practical**

**Course Book – Year 2**

**Lecturer's name: Bnar Khalid Bakr**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Plant anatomy and taxonomy** |
| **2. Lecturer in charge** | **Lecturer Bnar Khalid Bakr** |
| **3. Department/ College** | **Biology/Science** |
| **4. Contact** | **e-mail:** **bnarkhalid@yahoo.com****Tel: (optional)** |
| **5. Time (in hours) per week** | **Practical: 6** |
| **6. Office hours** | **5 hours** |
| **7. Course code** | **SBio 204** |
| **8. Teacher's academic****profile** | **\* I garudate from Salahaddin Univeristy in (2005)(ranked****2nd in collage) worked as Assistant biology for three years****in various Lab. As in General biology lab. , in histology and embryology lab. , in anatomy and taxonomy lab. ,****…… In 2008 started in MSc till 2011 finished my MSc****degree in plant taxonomy(Participate in teaching method training ) then started worked as assistant lecturer in****2012 …. I teaching practical general biology in year 1 for one course after that I started teaching practical plant anatomy and taxonomy in year 2 till now.****\* During these five year I supervising 8 student in year****6 at three research project .****\* For 3 year became head of Herbarium committee.****\* Now I am planning to make scientific research for better scientific performance in my field.** |
| **9. Keywords** | **Plant , Plant anatomy , Plant taxonomy , Plant tissue , Plant parts , Plant morphology feature ….** |
| **10. Course overview:**The importance of studying these subjects to understanding different plant parts anatomically and identified functional morphology of photosynthetic organisms both aquatic and terrestrial systems .In first course (plant anatomy) understanding the anatomy of plants at the cell, tissue andorgan levels and recognize and describe feature of plants part anatomically with details. In second course (plant taxonomy)focused on morphological features of plant parts started from (root, stem, leaves, flower parts with details , inflorescence, fruit and family identification).Generally student have ability to identified the plant family morphologically.The importance side of plant anatomy student can able anatomically differences between the plant parts such as ( shape of cells, shape of vascular bundle, number of vascular bundle, arrangement of layers in plant parts.In plant taxonomy student can able to identified the plant family by having the morphological information about the plant parts during the course subject.The most importance point in these two courses differentiation between monocot nad |

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| dicot plant parts (root, stem, leaves) and identification of plant family morphologicallyrelated to medicinal plant uses. |
| **11. Course objective:**Plant anatomy, plant tissue, epidermis and cells, types of stomata, types of epidermal hair, permanent tissue(paranchyama, chollemchyma and sclerenchyma ), vascular tissue anatomy (xylem and phloem), root anatomy , stem anatomy and leaf anatomy, classification of all plant parts( root, stem leaf, flower part (androecium and gynoecium) , inflorescence and fruit classification , finally family identification.• Anatomy of all parts of plant body and understanding all cells that contained it.• Identify all layers of root, stem and leaf anatomy.• Taxonomy of all plant parts morphologically .• Plant family identification. |
| **12. Student's obligation**\* Attendance at determinate time during the lab.\* Preparation for previous lab (quiz).\* Preparing homework because part of mark on it.\* Must be wearing lab coat. |
| **13. Forms of teaching**Different forms of teaching will be used to reach the objectives of the course: black board, paper printing, power point presentations for the head titles and definitions and summary of conclusions with using cell and tissue anatomical slide and collection of fresh sample for studying plant morphology (taxonomy). |
| **14. Assessment scheme**- One main examination …………………………………………………………………………………… %75- Copybook (Draw and label), home work and activity of student in lab & Quiz.... %25 |
| **15. Student learning outcome:**After completing this course, students will be able to: Understanding what is the plant anatomy and morphology of plant parts. |

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|  Recognized and be able to describe featuers of plant anatomy at the cell, tissuesand organ level with classification of plants according to various feature. Use microscopy tools for studying cells and tissues and families identification. Critically read literature in the field of plant anatomy and morphology. Family identification have great role for identifying **medicinal plants** using as pharmaceutical agent. |
| **16. Course Reading List and References:**Required books:1. Wilson, C. L. and Loomis, W. E. 1997. Botany. 4th edition.2. Stuessy, T. F. (1990). Plant Taxonomy. Columbia Univ. Press, NewYork , United State ofAmerica .3. Ravindra, N. 2003. Principal of modern Botany. New Delhi4. Bhattacharya, K; Hait, G. and Ghosh, A.K. 2007. A Text Book of Botany. New CentralBook Agency (P) Ltd. New Delhi.5. Raven, P. H.; Evert, R. F. and Eichhorn, S. E. 2005. Biology of Plants. 7th edition. W.H.Freeman and Company Publishers. New York.6. Some of website. |
| **18. Practical Topics** |  |
| **Date** | **Lab topics of plant Anatomy** | **Date** | **Lab topics of plant Taxonomy** |
| **Week1** | The plant cell wall | **Week1** | The processes of plant taxonomy with terminology of plant taxonomy |
| Week2 | Pits and types of pits | Week2 | Root classification |

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| **Week3** | Plant tissues(meristematic tissues), | Week3 | Stem classification |
| **Week4** | Permanent tissues(epidermis). | **Week4** | Leaf classification |
| **Week5** | Stomata | **Week5** | Flower parts classification |
| **Week6** | Epidermal hairs | Week6 | Flower symmetry |
| Week7 | Paranchyma, collenchyma tissue | Week7 | Androcieum and Gynocieum |
| Week8 | sclerenchyma tissues | Week8 | Inflorescence classification |
| Week9 | Secretory structures | Week9 | Fruit classification |
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| First Exam |
| Week10 | Xylem and phloem tissues | Week10 | Family identification (F:Cruciferae and F: Palmae) |
| Week11 | Types of vascular bundle | Week11 | Family identification (F:Malvaceae and F: Convolvulaceae) |
| Week12 | Root anatomy |  |  |
|  | Stem anatomy |  |  |
| **Week13** | Leaf anatomy |  |  |
| Second Exam |
| **19. Examinations:*****1. Identifying slide:*** must be identify the slide perfectly and identifying pointed part if they needed.***2. Compositional:*** In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?With their typical answersExamples should be provided |

***3. True or false type of exams:***

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

***4. Multiple choices:***

In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.

***5. Draw and label*** : in this type question nedd to draw picture scineifically and labelling all parts of darwing.

Head of biology department

Muhammad Ali Saleem