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| **C:\Users\Omar Hirzallah\Documents\شعار%20الجامعة%20الهاشمية.jpg** |  **Hashemite University****Faculty of Science****Course Syllabus** |  |

 **Department of Biology & Biotechnology**

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| **Course Title**: Plant Anatomy | **Course Number:** 110104254 |
| **Pre-requisite**: 110104251 | **Credit Hours**: 3 (2 hrs. theory + 1hr. practical) |
| **Designation**: : Compulsory | **Instructor**: Rajaa Abueideh |
| **Instructor's E-mail**: raj@hu.edu.jo | **Office Location:** Bio-103 & /or  |
| **Internet Home Page:** staff.hu.edu.jo/rajaa | Herbarium Lab. at Herbarium building |
| **Office Hours**: 9 -10 Sunday, 9.30-10.30 Wednesday , 10-11 Thursday  |
| **Lecture Times:** 10-11 (Sunday, Tuesday)  |
| **Lecture Room:** Room مبنى ابن رشد 205  |

**Course Description:** This course emphasizes on the internal structure of the vascular plants, especially the angiosperms (flowering plants) with consideration of certain features of gymnosperms. The course will cover the comparative structure, growth of meristems, structure of important cell types, tissues, tissue systems; comparative anatomy of stem, root, leaf, flower, seed and fruit. The skills in specimen preparation for microscopic observation, light microscopy will be attained in the practical training during this course.

**Text Book**: **Esau’s Plant Anatomy,** by Evert.R.F. John, 3rd edition. Wiley & Sons, Inc. New York 2006.

 **References**: - **Anatomy of Seed Plants,** by K. Esau, 2nd edition, John Wiley & Sons, Inc., New York, 1977.

 **- Integrative Plant Anatomy,** by W**.** Dickison, 1st edition, John Wiley & Sons, Inc., New York, 2000.

 **- Anatomy of flowering plants**,by P. Rudal, 3rd edition. Cambridge University Press, New York, 2007.

 **- Plant Anatomy,** by S.N. Pandey & A. Chadha, 5th edition, Chand & Company New Delhi.1996.

 **- Plant Anatomy and Embryology, by** S.N. & A. Chadha, Vikas Publishing House. New Delhi.1996.

 **- Plant Anatomy, by A. Fahn, 2nd edition,** Pergamon Press. Oxford, 1974.

**Major Topics Covered by Theory Classes**

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| **Topics** | **No. of Weeks** | **Contact Hours\*** |
| Introduction to Plant Anatomy  | 1 | 2 |
| The Cell Structure and Content  | 1 | 2 |
| The Cell Wall | 1.5 | 3 |
| Permanent Tissues (Parenchyma, Collenchyma & Sclerenchyma) | 1 | 2 |
| Epidermis | 1 | 2 |
| Secretory structures | 1 | 2 |
| Vascular Tissues (Xylem & Phloem) | 2 | 4 |
| Meristematic Tissues & Periderm | 1 | 2 |

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| **Topics** | **No. of Weeks** | **Contact Hours\*** |
| The Root | 1 | 2 |
| The Stem | 1 | 2 |
| The Leaf | 1 | 2 |
| The Flower | 1.5 | 3 |
| **Total** | **14** | **28** |

\*Contact Hours include lectures and exams.

**Major Topics Covered by Practical Sessions**

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| **Topics** | **No. of Weeks** | **Contact Hours\*** |
| Introduction, lab. Instructions & The microscope | 1 | 3 |
| Primary Plant Body , Plant Cell Structure & Parenchyma tissue | 1 | 3 |
| Collenchyma & Sclerenchyma | 1 | 3 |
| Epidermis & Trichomes | 1 | 3 |
| Secretory structures & Periderm | 1 | 3 |
| Xylem | 1 | 3 |
| Xylem & Vascular cambium  | 1 | 3 |
| Phloem, Stele structure & Vascular bundles | 1 | 3 |
| The Root (Primary and Secondary state of growth) | 1 | 3 |
| The Stem (Primary and Secondary state of growth | 1 | 3 |
| The Leaf | 1 | 3 |
| Floral Anatomy Embryo, Seeds & Fruits | 1 | 3 |
| Revision & Visit to the Botanical Garden | 1 | 3 |
| **Total** | **13** | **39** |

\*Contact Hours include laboratory sessions, quizzes, field trips and exams.

* **Specific Outcomes of Instruction (Course Learning Outcomes):**

After completing this course units, the students will be able to:

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|  | **Course Learning Outcomes (CLO)** | **(SO\*)** |
| **CLO1.** | Understand the basic internal structure of vascular plants. | (a), (b), (c) |
| **CLO2.** | Understand the hierarchy of plant structure by learning the basic features of plant cells, tissues, and organs | (a), (b), (c)  |
| **CLO3.** | Differentiate between different plant tissues. | (a), (b) |
| **CLO4.** | Correlate the structure of particular types of cells and tissues to their functions. | (a), (b), (d), (g) |
| **CLO5.** | Describe the organization of plant tissues in roots, stems, leaves and flowers. | (a), (b), (c),(g) |
| **CLO6.** | Compare between Monocots and Dicots using anatomical features of the different plant organs. | (a), (b), (c) |
| **CLO7.** | Differentiate between angiosperms and gymnosperms based on the anatomy of different organs. | (a), (b), (c) |

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|  | **Course Learning Outcomes (CLO)** | **(SO\*)** |
| **CLO8.** | Explain the differences between the primary growth and the secondary growth in plants. | (a), (b), (c) |
| **CLO9.** | Discuss the anatomical adaptation of different plant organs to different environments. | (a), (b) , (g), (h) |
| **CLO 10.** | Explain the major secretory structures present in plant tissues and organs. | (a), (b), (c), (d) |
| **CLO 11.** | Understand the fundamentals of angiosperms life cycle. | (a), (d), (g) |
| **CLO 12.** | Use the compound microscope properly in examining plant tissues. | (a). (b). (h) |
| **CLO 13.** | Interpret the images that they he see through the microscope. | (a), (c) |
| **CLO 14.** | Report the observation in schematic drawing. | (a)  |

\***(SO)** = Student Outcomes Addressed by the Course.

* **Student Outcomes (SO) Addressed by the Course:**

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| **#** | **Outcomes Description** | **Contribution** |
|  **Applied and Natural Sciences Student Outcomes** |
| (a) | A broad understanding of the major concepts in the biological sciences. | H |
| (b) | The ability to recognize the relationship between structure and function at all levels:  molecular, cellular, and organismal. | H |
| (c) | The technical and analytical skills to use biological instrumentation and proper laboratory techniques. | H |
| (d) | The ability to apply methods of scientific inquiry in biology. | M |
| (e) | An understanding of the role of science in society and the ethical conduct of science. | H |
| (f) | The ability to communicate effectively  | H |
| (g) | A recognition of the need for, and an ability to engage in life-long learning  | M |
| (h) | A knowledge of contemporary issues  | H |
| **H** = High, **M** = Medium, **L** = Low |

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| **Grading Plan** |  |  |  |
| **Theory** |  |  |  |
| First Exam | 5th – 6th week | 22.5 points | 22/2/2018 |
| Second Exam | 10th – 11th week  | 22.5 points | 29/3/2018 |
| Final Exam | 15th – 16th week | 30 points | To be announced by the registrar |
|  | **Total**  | **75 points** |  |
| **Practical** |  |  |  |
| Quizzes |  | 5 points |  |
| Reports |  | 2 points |  |
| Mid – Term Test |  | 5 points | 21/3/2018 |
| Activities & lab. work  |  | 3 points |  |
| Final Test |  | 10 points | 25/4/2018 |
|  | **Total** | **25 points** |  |
| **Total** |  | **100points** |  |

**General Notes: (Attendance Policy)** students are expected to attend every class and arrive on time in compliance with HU regulations. In case you find yourself in a situation that prevents you from attending class or exam, you have to inform your instructor. If you miss more than **4 classes** or **2 laboratory sessions**, you cannot pass the course. Makeup excuses will be accepted only for very limited justified cases, such as illness and emergencies. Changing your section without informing your instructors is not accepted at all.