



The Islamia University of Bahawalpur

Abbasia Campus, Bahawalpur, Pakistan Ph: +92 - 62 - 9239114, Fax: +92 - 62 - 9250099 Email:qec@iub.edu.pk

Tentative Course Plan DEPARTMENT OF BOTANY

Class: BS Botany & Zoology Semester-4th (Botany) Session: 2018-22(Spring)

Instructor	Ghulam Sarwar	Email:	lifesci.flora786@gmail.com
Course Title	Laboratory Techniques in Plants	Program	BS Botany
Course Number	BOTA-01402	Credit Hours	4(2+2)

Lecture			
Lecture			

Course Objective:
To provide the students understanding about principles of microscopy and
To learn basic laboratory techniques to study fresh and preserved plant materials
To provide hands on practice on various laboratory techniques involved in plant investigations.

Course Outcomes:

Methods of Teaching <ul style="list-style-type: none">Assigned readings ✓Group activities & Discussion ✓Audiovisual aids lectures ✓Web-assisted instruction ✓Student-Directed Teaching ✓

Resource Material	Books Prescribed: 1. Campbell, M.K. and F. Shawn. 2008. Biochemistry 6 th Edition. 2. Heldt, H-W. 2008. Plant Biochemistry. 3 rd Edition, Academic Press, U.K. 3. Goodwin T. W. and Mercer, E. I. 1997. Introduction to Plant Biochemistry. Pergamon Press, Oxford. 4. Dickison, W. C. 2000. Integrative plant anatomy. Academic Press, U. K. 5. Fahn, A. 1990. Plant Anatomy. Pergamum Press, Oxford. 6. Esau, K. 1960. Anatomy of Seed Plants. John Wiley, New York. 7. Metcalf, C. R. and Chalk, L. 1950. Anatomy of the Dicotyledons. Clerondon Press. Oxford.		
	2.Reference Book		3.Research Papers
	i	Schultz J.C. 2005. World of the Cell	i
	ii		ii
	4.Hot Research Papers		5.Web Resources
	i		i Plant Physiology & Biochemistry
	ii		ii Annual Review of Plant sciences

Office Help Hours	
Grading	Exam (Date to be announced) Mid- Exam (30%) Final Exam (50%) Problem Session/Assignments (20%)
Problem Session	

SEQUENCE OF TOPICS TO BE COVERED

Session	Topics (outline of main topics and sub topics)	Chapter #	Tutorial /Laboratory
1	Introductory lecture to the subject		1. Preparation of anatomical and surface slides through hand and microtome sectioning.
2 & 3	General Laboratory Glassware and care, Laboratory safety measures.	Lab. Safety	
4 & 5	Elementary Microscopy and principals of optics: light microscopy, Magnification, Resolution, contrast.	Microscopy	
5 & 6	Types of microscopy: Phase contrast, Dark field and Electron microscopy.	-do-	
7& 8	Collection and handling of material- (Anatomy, Chromosomal study and mycorrhiza).	Sample Handling	2. Study of morphology and reproductive structures of the types mentioned in theory.
9 & 10	Principles and methods involved in the killing, fixing and storage of materials, Chemicals used and their properties.	-do-	
11 & 12	Recipes and preparations of important fixatives, Dyes and related reagents and solutions.	Recipes	
13 & 14	Histo-chemistry, plant crystallography, localization of various chemicals in plant tissues.	Histo-chemistry	

15, 16	Introduction to Histology-1, histological studies in plant and animal tissues by fixation, decalcification of animal tissues, dehydration.	Histology-1	3. Handling and preparation of slides for staining of various plant tissues.
Mid Term Exams			
17&18	Impregnation and Embedding techniques, Section cutting staining and mounting procedures. Project Assignment.	Histology-2	4. Study of morphology and reproductive structures of the types mentioned in theory.
19&20	Use of stage and Ocular micrometer, calibration of ocular micrometer. Size measurement of different microscopic objects.	Micrometry	
21&22	Procedures for whole mounts and smears, collection of algae and pond microorganisms and microscopy.	Procedures	
23 &24	Centrifugation, Ultra centrifugation, cell fractionation, Cell fractionation, filtration, Distillation.	Extraction techniques	5. Identification of various types mentioned from prepared slides and fresh collections.
25&26	Chromatography: principle, applications types, thin layer chromatography, column and ion exchange chromatography.	Separation techniques	
27 & 28	Principle and applications.	Electrophoresis	
29	Biological photography and importance.	Photography	6. Handling and preparation of slides for staining of various plant tissues.
30	Presentations and work on the project	Assignments	
31	Course/Discussion from session 1- 28	-do-	
32	Final Term Exam		

Student Evaluation criteria:

Attendance	5%
Workshop / Assignments/Case study	5%
Surprise Test/Sudden Test , Quizzes	5%
Class Participation	5%
Mid Term Paper	30%
Final Term paper	50%
Total	100%

Student Responsibilities:

Students must attend class. Failure to attend class may result in failure in the course. Students must also arrive on time and remain in class for the entire period. Cellular Phones and Beeper must be Turned off (Proper classroom decorum [behavior] adopts, Course outlines and calendars explain requirements and assignments, students are responsible for knowing what they say. Students are also responsible for doing all assigned work on time. Excessive absences (more than 03) will result in “F Grade”. Students may prepare Sketchbook for taking notes and for references.

Instructor/Tutor

Approved by:

Chairman