



**Swami Shraddhanand College
(University of Delhi)**

Alipur, Delhi- 1100036

www.ss.du.ac.in

Lesson Plan

Name of Teacher	Dr. Isha Gunwal (1 class/week) Dr. Narendra Sharma (1 class/week)	Department	Botany
Course	B.Sc. (H) Botany	Semester	I
Paper	Basic Laboratory and Field Skills in Plant Biology	Academic Year	2023-2024
Learning Objectives			
<p>The course will help students gain knowledge about:</p> <ul style="list-style-type: none"> •To learn fundamental skills important for performing laboratory and field experiments 			
Learning Outcomes			
<p>This course will be able to demonstrate basic knowledge and understanding of:</p> <ul style="list-style-type: none"> •Good laboratory practices, management of laboratory waste, understanding hazards and risks to ensure a safe laboratory environment. •Basics of measurements, units and common mathematical calculations, sampling and data collection. •Operation and maintenance of instruments •Presentation, analysis of data and interpretation of results. 			

Lesson Plan

Week No.	Theme/ Curriculum
1. Week 1 (21 st -27 th Aug 23)	<p>Unit 3: Microscopes (Dissecting, Compound) (Dr Isha Gunwal)</p> <p>Unit 1: General laboratory safety, good laboratory practices, safety symbols, Biosafety measures (first-aid practices to be followed in case of burn, acid spills and injury (Dr Narendra Sharma))</p>
2. Week 2 (28 th -3 rd Sept 23)	<p>Electron microscopes, Fixation and Preservation (for light and electron microscopy); staining, mounting (Dr. Isha Gunwal)</p> <p>classes of laboratory chemicals, maintenance and handling of chemicals (Labels, Quality - LR/ AR/ Molecular biology grade/ HPLC grade; Expiry date; Precautions for use) (Dr. Narendra Sharma)</p>
3. Week 3 (4 th -10 th Sept 23)	<p>Basic introduction to other types of microscopes (Confocal, Fluorescence) (Dr. Isha Gunwal)</p> <p>lab safety equipment's (fire extinguisher, fume hood, safety glasses), Disinfectants, Biocontainment, Disposal of hazardous chemicals (Dr. Narendra Sharma)</p>
4 Week 4 (11 th -17 th Sept 23)	<p>UNIT-4: Units of measurements and conversion from one unit to another, measurement of volumes of liquids. (Dr. Isha Gunwal)</p> <p>UNIT-2: Weighing balance (Top loading and Analytical), pH meter (calibration and use) (Dr. Narendra Sharma)</p>
5 Week 5 (18 th -24 th Sept 23)	<p>calculations: scientific notations, powers, logarithm and fractions (Dr. Isha Gunwal)</p> <p>laminar airflow, BOD incubator, incubator shaker (Dr. Narendra Sharma)</p>
6 Week 6 (25 th -1 th Oct 23)	<p>UNIT-5: Molarity, Molality, Normality (Dr. Isha Gunwal)</p> <p>Magnetic stirrer, pipettes and micropipettes, autoclave (Dr. Narendra Sharma)</p>
7 Week 7 (2 nd -8 th oct 23)	<p>percent solution, stock solution, standard solution (Dr. Isha Gunwal)</p> <p>Micrometer, haemocytometer, spectrophotometer (Dr. Narendra Sharma)</p>

8 Week 8 (9 th -15 th oct 23)	dilution, dilution series, pH, acids and bases (Dr. Isha Gunwal) Micrometer, haemocytometer, spectrophotometer (Dr. Narendra Sharma)
9 Week 9 (16 th -22 th Oct 23)	buffers - phosphate, Tris- acetate, Tris- Cl and Citrate buffer. (Dr. Isha Gunwal) Agarose gel electrophoresis unit, SDS PAGE unit, centrifuge (Dr. Narendra Sharma)
10 Week 10 (23 th -29 th Oct 23)	Unit 6: Basic culture media (LB-liquid and solid) (Dr. Isha Gunwal) distillation unit, conductivity meter, Lux meter (Dr. Narendra Sharma)
11 Week 11 (30 th -5 th Nov 23)	Basic culture media (YEB-liquid and solid) (Dr. Isha Gunwal) Unit 7: Fundamentals of data collection, data types - primary and secondary, methods of data collection, sample, sampling methods - merits and demerits (Dr. Narendra Sharma)
12 Week 12 (6 th -12 th Nov 23)	Culture techniques: plating (streak, spread & pour) (Dr. Isha Gunwal) technical and biological replicates, classification - tabulation and presentation of data (Dr. Narendra Sharma)
13 Week 13 (13 th -19 th Nov 23)	replica plating, serial dilution, Identification, collection, cataloguing and preservation of plant specimens (Dr. Isha Gunwal) Descriptive statistics - Mean, Mode, Median, Variance, Standard Deviation, Standard error, Coefficient of Variation, difference between sample mean and population mean. (Dr. Narendra Sharma)
14 Week 14 (20 th -26 th Nov 23)	Herbarium and Museum. (Dr. Isha Gunwal) Unit 8: MS-Word, PowerPoint, Excel, introduction to biological databases (Dr. Narendra Sharma)
15 Week 15 (27 th -3 rd Dec 23)	Internal Assessment Test
16 Week 16 (4 th -6 th Dec 23)	Revision of all the topics
Suggested Readings	

Books	<ul style="list-style-type: none"> • Evert, R. F., Eichhorn, S. E., Perry, J.B. (2012). Laboratory Topics in Botany. W.H. Freeman and Company. • Mesh, M.S., Kebede-Westhead, E. (2012). Essential Laboratory Skills for Biosciences. John Wiley & Sons, Ltd. • Mu, P., Plummer, D. T. (2001). Introduction to practical biochemistry. Tata McGraw-Hill Education. • Mann, S. P. (2016). Introductory Statistics, 9th edition. Hoboken, NJ, John Wiley and Sons Inc. • Danniel, W.W. (1987). Biostatistics. New York, NY: John Wiley Sons. • Jones, A.M., Reed, R., Weyers, J. (2016). Practical Skills in Biology, 6th Edition, Pearson • Bisen, P.S. (2014). Laboratory Protocols in Applied Life Sciences, 1st edition. CRC Press.
Assignment and Class Test Schedule for Semester	
Assignments: Submission by 10th November 2023	