Curriculum Planner
(Department of Botany, Kalindi College)
Dr. Priyanka Verma (2024-2025)

Course: B.Sc.(H) Botany
Semester: I
Paper: Basic Laboratory and field skills (Theory & Practical) DSC

Topic	Reference	Approximate (schedule)
Unit 1: Lab safety and good lab practices General laboratory safety, good laboratory practices, biosafety measures (first-aid practices to be followed in case of burn, acid spills and injury), safety symbols, lab safety equipments (fire extinguisher, fume hood, safety glasses), classes of laboratory chemicals, maintenance and handling of chemicals (Labels, Quality - LR/ AR/ Molecular biology grade/ HPLC grade/Tissue culture grade; Expiry date; Precautions for use), Disinfectants, Biocontainment, Disposal of hazardous chemicals, radioactive and biological waste, Laboratory waste management. Unit 2: Use and maintenance of Laboratory equipment Weighing balance (Top loading and Analytical), pH meter(calibration and use), magnetic stirrer, pipettes and micropipettes, autoclave, laminar airflow, BOD incubator, incubator shaker, micrometer, haemocytometer, spectrophotometer, Agarose gel electrophoresis unit, SDS PAGE unit, centrifuge, distillation unit, conductivitymeter, Lux meter. Unit 3: Microscopy, sample and slide preparation Weeks: 2.5	1. Evert, R. F., Eichhorn, S. E., Perry, J.B. (2012). Laboratory Topics in Botany. W.H. Freeman and Company. 2. Mesh, M.S., Kebede-Westhead, E. (2012). Essential Laboratory Skills for Biosciences. John Wiley & Sons, Ltd. 3. Mu, P., Plummer, D. T. (2001). Introduction to practical biochemistry. Tata McGraw-Hill Education. 4. Mann, S. P. (2016). Introductory Statistics, 9th edition. Hoboken, NJ, John Wiley and Sons Inc. 5. Danniel, W.W. (1987). Biostatistics. New	August 2024- December 2024

Microscopes (Dissecting, Compound and Electron microscopes), Fixation and Preservation (for light and electron microscopy); staining, mounting; basic introduction to other types of microscopes (Confocal, Fluorescence) Unit 4: Measurements and calculations Week: 01 Units of measurements and conversion from one unit to another, measurement of volumes of liquids, Weighing, calculations: scientific notations, powers, logarithm and fractions. Unit 5: Solutions and Buffers Week: 01 Molarity, Molality, Normality, percent solution, stock solution, standard solution, dilution, dilution series, pH, acids and bases, buffers - phosphate, Tris- acetate, Tris-Cl and Citrate buffer. Unit 6: Basic culturing techniques Weeks: 1.5 Basic culture media (LB, YEB, MS)- liquid and solid, Culture techniques: plating Unit 7: Data collection, statistical analysis and interpretation Weeks: 02 Fundamentals of data collection, data types - primary and secondary, methods of data collection, sample, sampling methods - merits and demerits, technical and biological replicates, classification - tabulation and presentation of data, Descriptive statistics -Mean, Mode, Median, Variance, Standard Deviation, Standard error, Coefficient of Variation, difference between sample mean and population mean. Unit 8: Basic computer skills for biology Weeks: 02 MS-Word, PowerPoint, Excel, introduction to biological databases. Unit 9: Field Skills Week: 01 Identification, collection, cataloguing and preservation of plant specimens, Herbarium and Museum.	York, NY: John Wiley Sons. 6. Jones, A.M., Reed, R., Weyers, J. (2016). Practical Skills in Biology, 6th Edition, Pearson 7. Bisen, P.S. (2014). Laboratory Protocols in Applied Life Sciences, 1st edition. CRC Press. Suggested readings: 8. Zar, Z. H. (2010). Biostatistical Analysis, 5th edition, Pearson Prentice Hall, New Jersey, USA..	

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Practical component: 1. Preparation of solutions- molar, molal, normal, percentage, stock, standard and serial dilution 2. Determining pH of solutions (pH paper, Universal indicator, pH meter) and preparation of buffers (Phosphate, Tris-Cl, Electrophoresis buffers - TBE/TAE) 3. Working of instruments -light microscope, autoclave, laminar air flow, spectrophotometer, centrifuge, gel electrophoresis unit (Agarose & Poly acrylamide). 4. Temporary peel mount slide preparation and staining (safranin and acetocarmine). 5. Calculate cell size using micrometer. 6. Calculate number of cells (pollen/spores) using haemocytometer. 7. Preparation of LB medium, growth and maintenance of bacterial cultures (liquid –serial dilution method; and semi-solid cultures - streak, spread and pour plates) 8. Isolation of genomic DNA from E. coli and plant leaf material, Agarose gel electrophoresis 9. Calculation of mean, mode, median, standard deviation using data set (collected from experiments 5 and 6). 10. Using software to draw tables, graphs and calculating descriptive statistics(Microsoft Excel) 11. Laboratory safety equipment (Fire extinguisher, Fume hood, safety glasses) 12. Mounting of a properly dried and processed plant specimen with herbarium label.	• 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. Suggested readings: • Zar, Z. H. (2010). Biostatistical Analysis, 5th edition, Pearson Prentice Hall, New Jersey, USA.	August 2024- December 2024