Minor/Common courses for M.Sc. Ag., H.Sc. and Fisheries

PPHY-521:   PRINCIPLES OF PLANT PHYSIOLOGY   3(2+1)

Theory:

Cell organelles and their physiological functions, structure and physiological functions of cell wall, cell inclusions; cell membrane: structure and functions. Soil and plant water uptake, water and its role in plants, properties and functions of water in the cell water relations, cell water terminology, water potential of plant cells.

Mechanism of water uptake by root, transport in root, aquaporins, movements of water in plants, Micorrhizal association on water uptake.

Water loss from plants :Evapo-transpiration. Transpiration, driving force for transpiration, plant factors influencing transpiration rate.

Stomata: structure and function, mechanism of stomatal movement, antitranspirants.

The role of mineral nutrition in plant metabolism: essential elements, classification based on functions of elements in plants.

Physiological and metabolic functions of mineral elements, critical levels, deficiency symptoms, nutrient deficiency and toxicity, foliar nutrition.

Photosynthesis and its importance in bio-productivity. Photochemical process, photochemical reactions, CO_2 reduction in calvin cycle, supplementary pathway of CO_2 fixation in C_4 and CAM plants and its significance.

Mitochondrial respiration

Growth and differentiation, Hormonal concept of growth and differentiation, plant growth hormones and their physiological role, synthetic growth regulators, growth retardants, apical dominance, senescence, fruit growth, abscission.

Practical:

Measurement of plant water status: RWC, WSD, VPD.

Measurement of transpiration rate: Porometry study, influence of ABA on stomatal closing.

Deficiency systems of nutrients.

Estimation of chlorophyll and chlorophyll stability index.

Oxygen evolution during photosynthesis.

Suggested Readings:

Hopkins, W.G. &Huner N.P.A.2004 Introduction to plant physiology. John Wiley& Sons.

Salisbury F.B. & Ross, C.1992. Plant Physiology, IVth Edition, Wardsworth Publication.

Mukherji, S. &Ghosh, A. K. 2005.Plant Physiology. New Central Book Agency ,Kolkata.

Theory:

Probability and Probability Distribution: Various definitions of probability, Addition and multiplication laws of probability and simple problems based on them. Expectation of a random variable, Moments, Skewness and Kurtosis.

Binomial and Poisson distribution, their fitting and simple problems based on them, Normal distribution, their properties and uses. Sampling: Sampling v/s Complete enumeration, Probability and non probability sampling, S.R.S. with and without replacement.

Test of significance: Hypothesis, null and Alternative hypothesis, type-I and type-II error, Level of significance, Critical region, one and two tailed tests, Procedure for testing of hypotheses. Standard Normal deviate test for single mean, difference of two means. Proportion, difference of proportion and confidence interval, students `t' test, for comparison involving one and two sample means, paired `t' test, Confidence interval, Chi-square test for goodness of fit and independence of two attributes (2x2 and r x s contingency table) and Yate's correction for continuity, Correlation and Regression : Simple and partial correlation coefficients, Linear and multiple regressions. Partial regression coefficients, multiple correlation coefficients and their tests of significance.

Design of Experiments : Analysis of C.R.D., R.B.D. and L.S.D. with one observation per cell.

Practical:

Simple problem based on probability, Simple problems based on Binomial, Poisson and Normal distribution. Problem based on area tables of Normal distribution. Draw simple random-sample of size 'n' from a given population of size 'N' with and without replacement scheme and obtain the estimate of (i) population mean (ii) population variance and (iii) standard error. Standard normal deviate tests for testing (i) $\mu = \mu_0$, (ii) $\mu_1 = \mu_2$, 't'-test for testing (i) $\mu = \mu_0$, (ii) $\mu_1 = \mu_2$, Confidence interval for means, for small and large samples. Chi-square test for goodness of fit. Chi-square test for independence of two attributes, 2x2, r x s contingency table and Yates'correction . Fitting of Regression line (i) $Y = a+bX$ and test for $\beta_{yx} = 0$ (ii) $Y = a+b_1x_1 + b_2x_2$. Partial correlation coefficients and its tests of significance. Multiple correlation coefficient and its test by F-test

Suggested Readings:
1. V.G. Panse and P.V. Sukhatme (1985).Statistical Methods for Agricultural Workers. ICAR, New Delhi.
2. G.W. Snedecor and W.G. Cochran (1968).Statistical Methods.Oxford and IBH. New Delhi.
3. S.C. Gupta and V.K. Kapoor (2006). Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi.
4. Sukthame and C. Ashok (1984). Sampling Theories and Surveys with Application. ICAR, New Delhi, 3[rd]ed.
5. G.N. Rao (2007). Statistics for Agricultural Science. Oxford and IBH, New Delhi.
6. S.C. Gupta (2006). Fundamentals of Statistics.Himalaya Publishing House. New Delhi

STAT - 521   DESIGN OF EXPERIMENTS-I   3(2+1)

Theory:
Basic principles of design of experiments, Uniformity trials and their uses, Fair field Smiths Variance Law and optimum size and shape of plots. Efficiency of basic designs. Factorial experiments: Symmetrical and Asymmetrical factorial experiments, 2^n factorial experiments, Yates method and general method of analysis of AxB and AxBxC factorial experiments.
Confounding in case of 2^n factorial experiments, Complete and partial confounding. Layout and analysis of Split and Strip plot design. Missing plot technique in R.B.D. and L.S.D. with one observation missing.
Progeny Row trial and compact family block design. Transformations: Square root, Logarithmic and Angular transformation. Analysis of Covariance.

Practicals:
Analysis of 2^2 and 2^3 experiments in R.B.D., Analysis of AxB factorial experiments. Analysis of AxBxC factorial experiments, Complete confounding in case of 2^3 experiments, Partial confounding in case of 2^3 experiments, Missing plot analysis in case of R.B.D. with one observation missing, Missing plot analysis in case of L.S.D. with one observation missing. Analysis of Split plot and Strip plot design, Analysis of Covariance in case of R.B.D. Use of transformations

Suggested Readings:
1. K.A. Gomez and A.A. Gomez (1984).Statistical Procedures for Agricultural Research.John Wiley and Sons.
2. R.G.D. Steel and J.H. Torrie (1960).Principles and Procedures of Statistics. McGraw – Hill Book Co., New Delhi
3. V.G. Panse and P.V. Sukhtame (1985).Statistical Methods for Agricultural Workers. ICAR, New Delhi.
4. W.G.Cochran and G.M.Cox (1957). Experimental Designs.A Wiley International Edition. Canada.