



**Paper 14a RESEARCH METHODOLOGY, INSTRUMENTATION AND
USE OF COMPUTERS**

M.Sc. va (Candidates admitted from the academic year 2008-2009)

Core Theory

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UNIT I

Extraction and separation procedure: Solvent extraction. Purification by centrifugation, dialysis, Sephadex, gel filtration and column chromatography, Electrophoresis-gel electrophoresis. Paper and thin layer chromatography, Gas Chromatography, Colorimetry and Spectrophotometry and pH metry

UNIT II

Microscopy: Light microscopy, optical principles, magnification and resolution. Dark-field, phase contrast, polarized light, interference contrast (Nomarski) and fluorescence microscopy. Scanning and transmission electron microscopy. Photomicrography and photomacrography.

UNIT III

Microtomy and slide preparation: Fixatives, microtomy and staining technique. Preparation of whole mounts. Bright-field stains and fluorochromes. Metachromatic staining reaction.

UNIT IV

Histochemical dyes for the localization of starch, cell wall carbohydrates, proteins, nucleic acid and lipids. Principles of enzyme histochemistry. Principles of immunocytochemistry. Tissue Printing

UNIT V

Biostatistics: Frequency distribution, measure of central tendency, standard deviation and correlation and regression. Experimental design and analysis, test of significance and analysis of variance (ANOVA). Chi-square test.

UNIT VI

Introduction to Computers: Input and output devices, hardware and software.

Operating Systems : MS-DOS/WINDOWS

Word Processing : MS-WORD. Desk-top publishing.
Data Base : MS-EXCEL/MS-ACCESS

Computers and statistical analysis; graph generation, audiovisual presentation: MS-POWER POINT.

Retrieval of abstracts and bibliographic data. Internet and the World Wide Web.

Suggested Reading

- BERLYN, G.P. AND J.K.MIKSCHE. 1976. Botanical Microtechnique and cytochemistry. Iowa State University Press. Iowa. USA.
- CONN,H.J. 1991. Biological stains. Ninth Edition. Sigma Chemical Company, St. Louis. USA.
- CLARK, G. 1981. Staining Procedures. Fourth Edition. Williams & Wilkins Co. MD. U.S.A.
- DELLY,J. 1988. Photography through the microscope. Ninth edition. Eastman Kodak Co. New York.
- GAHAN, P.B. 1984. Plant Histochemistry and Cytochemistry - An Introduction. Academic Press. U.K.
- GOMEZ, K.A., AND A. GOMEZ. 1976. Statistical Procedures for Agricultural Research with Emphasis on Rice. IRRI. Philippines.
- HOROBIN, R.W. 1982. Histochemistry: An Explanatory Outline of Histochemistry and Biophysical Staining. Gustav Fischer Verlag. Stuttgart. Germany.
- HOROBIN, R.W. 1988. Understanding Histochemistry: Selection, Evaluation and Design of Biological Stains. Ellis Horwood Ltd. U.K.
- JENSEN, W.A. 1962. Botanical Histochemistry. W.H. Freeman and Company. San Francisco.

- KIERNAN, J.A. 1990. Histological and Histochemical Methods. Theory and Practice. Pergamon Press. U.K.
- KRISHNAMURTHY, K.V. 1988. Methods in Plant Histochemistry. S. Viswanathan (Printers & Publishers) Pvt. Ltd. Madras.
- LACEY, A.J. 1989. Light microscopy in biology - a practical approach. IRL Press. Oxford University Press. U.K.
- PALANICHAMY, S., AND M. MANOHARAN. 1990. Statistical Methods for Biologists. Palani Paramount Publisher. Palani. Tamil Nadu.
- PANSE, V.G., AND P.V. SUKHATME. 1985. Statistical Methods for Agricultural Workers. ICAR. New Delhi.
- PEARCE, A.G.E. 1980. Histochemistry : Theoretical and Applied. Vol. I and II. Fourth Edition. Churchill Livingstone. London.
- PRASAD, S. 1992. Fundamentals of Biostatistics (Biometry). Emkay Pub. Delhi
- REID, P.D., AND R.F. PONT-LEZICA (Eds.). 1992. Tissue Printing: tools for the study of anatomy, histochemistry, and gene expression. Academic Press. New York.
- ROBINSON, P.C. 1992. Qualitative polarized light microscopy. Royal Microscopical Society. Oxford University Press. U.K.
- SPEIGELS, M.R. 1972. Theory and Problems of Statistics. Shaum's Outline Series. McGraw Hill Book Co. Singapore.