

PMA102: RESEARCH METHODOLOGY

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Introduction: Nature and objectives of research, Study and formulation of research problem, Scope and formulation of hypothesis, Preparation and presentation of research and project proposals, Selection of thrust research.

Introduction to Statistical Analysis: Measures of Central Tendency and Dispersion, Mean, Median, Mode, Range, Mean deviation, Standard Deviation.

Random Variables and Probability Distribution: Definition, Distributions, Functions, Mathematical Expectation, Binomial, Poisson, Geometric, Negative binomial, Exponential, Normal and log-normal distributions.

Hypothesis Testing: Tests of Significance based on normal, t and chi-square distributions, Analysis of variance technique

Linear Regression and Correlation: Linear regression, least square principle and fitted models, Karl Pearson's correlation coefficient, Rank Correlation, Lines of regression.

Design of Experiments: Completely randomized design, Random block design, Latin square design, Statistical analysis and variances of estimates, Analysis of covariance.

Laboratory Work:

Implementation of statistical techniques using statistical packages viz., SPSS, Mathematica including evaluation of statistical parameters and data interpretation, Regression Analysis, Covariance, Hypothesis testing and analysis of variance.

Course Learning Outcome (CLO):

Students will be able to:

1. Develop testable hypotheses, differentiate research design and/or statistics, evaluate aptness of research conclusions, and generalize them appropriately.
2. Design and conduct quantitative or qualitative research studies in laboratory or field settings.
3. Use research data to formulate or evaluate new research questions, using reason and persuasion in a logical argument.

Recommended Books:

1. Dowdy, S., Wearden, S. and Chilko, D., *Statistics for Research, Wiley Series (2004)*
2. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., *Probability and Statistics for Engineers and Scientists, Pearson Education (2002).*