BAS 523 - Research Methodology (Credit 3+0+0=3)

Course Objectives:
To expose to various research methods and statistical tools required to analyze the experimental data in food research and industry.

Course Contents: Theory:

Unit No.	Contents
1	Introduction: Nature and objective of research, criteria of good research, scientific approach to research, limitations of applying scientific methods, Ethical issues in research, IPR.
2	Research process, Identification and formulation of a research problem, Steps involved in preparing research proposal. Research Design: exploratory, descriptive, and experimental. Probability and Probability distributions: Different Approaches of probability, addition rule & multiplication rule of probability, conditional probability, Bay's theorem, Binomial, Poisson and Normal distributions.
3	Data and data types, Data collection Methods: Observations, Survey, Interview and Questionnaire. Data Presentation and Analysis: diagrams and graphs, measures of central tendency, dispersion, skewness and kurtosis. Measurement and Scaling Techniques. Inferential Statistics – estimation, type-I and type-II error, testing of hypothesis, test of significance, t-test, Z-test, F-test, Chi-Square test, ANOVA. Design of Experiments: CRD, RBD and LSD.
4	Sampling: Introduction, concept of population, Law of statistical regularity, Law of large numbers, Census Enumeration, Sampling and sampling techniques. Statistical Quality Control: Quality control charts- p-chart, c-chart, X bar charts, R charts, σ charts, process under control and specification limits, process out of control, warning limits, control limits. Benefits & Limitations of Statistical Quality Control. Acceptance Sampling
5	Simple Linear Regression and Correlation: Lines of regression, Karl Pearson's Correlation coefficient, Rank correlation. Report Writing and Presentation: framework of reports, types of reports.

Note: -- Practical aspects of various statistical techniques were discussed with the students.

Suggested Readings:

1. Gupta, C.B.,An Introduction to Statistical Methods, 23rd Edition, Vikash Publications.
2. SC, Gupta & VK, Kapoor., Fundamentals of mathematical Statistics: A modern approach, (2000), Sultan Chand & Sons.
3. Dowdy, S., Wearden, S. and Chilko, D., Statistics for Research, Wiley series (2004).
4. Walpole, R.E., Myers, R.H., Myers, S.l. and Ye, K., Probability and Statistics for Engineers and Scientists, Pearson Education (2002).
5. D. N. Elhance., Fundamentals of Statistics, KitabMahal (1984).
6. C.R., Kothari, Research Methodology, New Age International (2009).
7. Priyaranjan Dash, Research Methodology with SPSS,Vrinda Publications (P) Ltd. (2011)
8. R. Panneerselvam, Research Methodology, PHI (2010).