

## Generic Elective (GE) Courses

### Generic Elective (GE) Course 2a: Statistics for Research and Management Studies

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the course (if any)
		Lecture (30 Hours)	Tutorial (00 Hours)	Practical (60 Hours)		
GE 2a: Statistics for Research and Management Studies	4	2	0	2	NIL	NIL

#### Course Objectives:

- To learn statistical techniques useful for research work.
- To understand the quantitative methods used in business and management studies.

**Course Learning Outcomes:** After successful completion of this course, the students will be able to:

- Know different types of data produced in their area of study.
- Create, manage, visualize, and summarize datasets.
- Use and understand the inferential procedures.
- Apply suitable sampling design.
- Understand and apply basic designs.
- Apply regression techniques.
- Apply suitable statistical techniques to analyze the data and interpret the results.

#### Unit I (7 Hours)

Data types, scale of measurement, creating and managing datasets, importing and exporting data, data cleaning. Summarizing data: Frequency and probability distributions, measures of central tendency, measures of dispersion, skewness and kurtosis. Correlation and regression, Measures of association, Cross tabulation. Visualizing data: Histogram, bar chart, pie chart, stem and leaf display, scatter plot, box and whisker plot.

## **Unit II (8 Hours)**

Inference: Population and sample, parameter and statistic, estimates and estimators, estimation of parameters, testing of hypothesis, type I and type II errors, p-value, inferences based on sample. Tests based on sampling distributions:  $Z$ ,  $t$ ,  $\chi^2$  and  $F$ .

## **Unit III (8 Hours)**

Concept of population and sample, complete enumeration versus sampling, sampling and non-sampling errors. Types of sampling: non-probability and probability sampling, basic principles of sample survey, Sampling Techniques: Simple random sampling, stratified random sampling, Cluster Sampling, Systematic sampling.

## **Unit IV (7 Hours)**

ANOVA for one way and two-way classification. ANCOVA, analysis of basic designs, analysis of 2 level factorial experiments. Simple and multiple regression, logistic regression.

**Note:** Data analysis and applications of the methods are to be carried out using calculator or by using a statistical package like Excel/R.

### **Essential Readings:**

1. Cochran, W.G. (2011). *Sampling Techniques*, John Wiley & Sons.
2. Judd, C.M., McClelland, G.H. and Ryan, C.S. (2009). *Data Analysis: A Model Comparison Approach*, Routledge.
3. Montgomery, D.C. (2001). *Design and Analysis of Experiments*, John Wiley.

### **Suggested Readings:**

1. Agresti, A. (2015). *Foundations of linear and generalized linear models*. John Wiley & Sons.
2. DeGroot, M.H. and Schervish, M.J. (2012). *Probability and Statistics*, Pearson.
3. Field, A., Miles, J. and Field, Z. (2012). *Discovering Statistics Using R*, Sage.
4. Rao R.D. (1988). *Exploring Statistics*, Markel Dekker.
5. Rice, J.A. (1995). *Mathematical Statistics and Data Analysis*, Duxbury Press.
6. Sukhatme, P.V., Sukhatme, B.V., Sukhatme, S. and Asok, C. (1984). *Sampling Theories of Survey with Application*, IOWA State University Press and Indian Society of Agricultural Statistics.
7. Taylor, J.K. and Cihon, C. (2004). *Statistical Techniques for Data Analysis*, Chapman & Hall.

**List of Practicals:**

1. Measures of central tendency, measures of dispersion, skewness and kurtosis.
2. Correlation and regression, measures of association, cross tabulation.
3. One-way ANOVA and two-way ANOVA and ANOCOVA.
4. Histogram, bar chart, pie chart, stem and leaf display, scatter plot, box and whisker plot
5. Testing of hypothesis.
6. Different sampling techniques as per syllabus.
7. Tests based on sampling distributions:  $Z$ ,  $t$ ,  $\chi^2$  and  $F$ .