CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
IT Skills and Data Analysis - I	2	0	0	2	Class XII	NIL

Learning Objectives

The primary objectives of the course will be to:
- Familiarise the student with the quantitative skills required for representing and interpreting data for the purpose of decision making.
- Equip the student with some fundamental concepts, which play a critical role in understanding and visualizing real world data.
- Enable the student to analyze data and problem situations using relevant IT tools.

Learning Outcomes

By the end of the course students will be able to

- Represent and interpret data in tabular and graphical forms
- Understand and interpret the measures of central tendency and dispersion.
- Use IT tools such as spreadsheets to visualise and analyse data.

PEDAGOGY

Relevant concepts and theory will be introduced which will be supplemented by hands-on activities enabled by the use of spreadsheets. This is a two credit course and will comprise two lecture periods per week. As this is essentially an activity-based course, it will involve two consecutive lecture periods, once in a week.

SYLLABUS
Practical

Unit I : What is Statistics ? (24 hours)

This unit provides an introduction to the fundamentals of datasets, sources of data, frequency distributions and graphical representations of data. The aim is to give students a hands-on experience of initiating data analysis through a spreadsheet.

- Concept of datasets (Variables, Observations)
  Reference 1, Chapter 2
- Different types of variables (Quantitative and Qualitative)
  Reference 1, Chapter 2
- Distinction between primary and secondary sources of data
  Reference 1, Chapter 2
- Basic idea of using questionnaire to collect primary data for analysis
  Reference 2, Chapter 1 [Section 1.6]
- How to construct a questionnaire
  Reference 1, Chapter 1
- Concept of frequency distribution: cumulative and relative frequencies
  Reference 2, Chapter 2
- Introduction to spreadsheet
  Reference 2, Chapter 2
  - Tabular and graphical presentation of data: data tables, frequency curve, histogram, bargraphs, pie charts (through the use of spreadsheets)
  Reference 2, Chapter 2

Unit II: Measures of Central Tendency and Dispersion (36 hours)

The focus of this unit will be to familiarize the student with summary statistics to describe datasets. In particular, two important characteristics of data, viz., central tendency and dispersion, will be used to summarize datasets using a spreadsheet. The concept of the Normal distribution and its characteristics will be discussed to highlight its relevance in modelling real life phenomenon.

- Measures of central tendency: mean, median, mode
  Reference 2, Chapter 3
- Examples of situations where it is appropriate to use the mean, median and mode asa measure of central tendency.
  Reference 2, Chapter 3
- Weighted mean
  Reference 2, Chapter 3
- Measures of dispersion: range, variance, standard deviation
  Reference 2, Chapter 3

- Quartiles, deciles and percentiles
  Reference 2, Chapter 3
- Visualize the measures of central tendency and dispersion through frequency curveand histogram
  Reference 2, Chapter 3
  - Skewness and kurtosis
    Reference 2, Chapter 3
- Normal curve and its basic properties: visual representation of population characteristics (height, weight, IQ etc.)
  Reference 2, Chapter 5 [Section 5.6]

References (Readings and Resources)

1. Rowntree, D., Statistics without tears - A primer for non-mathematicians, Allyn and Bacon, 2018.
2. Levin, Rubin, Rastogi and Siddiqui, Statistics for Management, 7th Edn, 2014

Suggested Data Sources

The following data sets are suggested to carry out the activities.
1. https://data.worldbank.org/
2. https://www.statista.com/
3. https://data.gov.in/
4. https://censusindia.gov.in/
5. https://www.kaggle.com/
6. http://data.un.org/

Weekly Plan

Weeks I and II: Students learn about the concept of datasets (Variables, Observations) ; Different type of Variables (Quantitative and Qualitative); Distinction between primary and secondary sources of data

Weeks III and IV: Basic idea of using questionnaire and how to construct it; Concept of frequency distribution - cumulative and relative frequencies; Introduction to spreadsheet.

Weeks V and VI: Tabular and graphical presentation of data: data tables, frequency curve, histogram, bar graphs, pie charts. Students explore various representations on spreadsheetusing data sets.

Weeks VII and VIII: Introduction of Measures of Central Tendency: Mean, Median, Mode through appropriate examples explaining the use of each one of them in various situations. Understanding the concept of Weighted mean.

Weeks IX and X: Measures of dispersion: Range, Variance, Standard deviation; Visualizing themeasures of central tendency and dispersion through frequency curve and histogram. Understanding Quartiles, deciles and percentiles numerically.

Weeks XI and XII: Representation of population characteristics using the basic properties of aNormal Curve, skewness and kurtosis.

Weeks XIII and XIV: Assignments based on Units 1 and 2 using spreadsheets to consolidate the learning of concepts covered.

Examination scheme and mode:
Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.