IT Skills and Data Analysis - II

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 - II	2	0	0	2	Class XII	IT Skills and Data Analysis - I

Learning Objectives

The primary objectives of the course will be to

- Familiarise the student with the quantitative skills required for corelating the datafor the purpose of decision making.
- Equip the student to visualise functions which play a critical role in understandingand 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

- Establish relationships between variables using correlation and regression analysis.
- Visualize functions and differentiate between linear and nonlinear functions.
- 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

Unit I: Functions and their graphical representations (16 hours)

This unit introduces the graphical visualisation of functions to understand the relationship between two variables.

- Definition and graphical representation of a function, vertical line test
  Reference 3
- Polynomial functions: linear, quadratic and cubic functions
  Reference 3
- Reciprocal, exponential and logarithmic functions
  Reference 3
- Concept of slope of a function through graphical representation
  Reference 3

Unit II: Relationship between Variables (28 hours)

Students will learn about scatter diagrams and correlation analysis as a means to describe the nature and strength of association between two variables. The concept of regression analysis will be introduced as a method for quantifying the relationship between two variables. Further, multiple linear regression will be discussed for situations where more than one independent variable is needed to estimate the dependent variable. The focus will be mainly on interpreting estimated regression coefficients.

- Scatter diagrams
  Reference 2, Chapter 12
- Correlation analysis : measure and interpretation of correlation coefficient andcoefficient of determination
  Reference 2, Chapter 12
- Hypotheses, model specification and testing
  Reference 2, Chapter 12
- Bi-variate regression analysis: method of least squares, curve of best fit as a modelfor prediction
  Reference 2,
  Chapter 12
- Multiple Linear Regression
  Reference 2,
  Chapter 13

Weeks 12 – 14: Project Presentations and Viva (16 hours)

References (Readings and Resources)

1. Rowntree, D., Statistics without tears - A primer for non-mathematicians, Allyn andBacon, 2018.

2. Levin, Rubin, Rastogi and Siddiqui, Statistics for Management, 7th Edn, 2014
3. Boundless Algebra : https://courses.lumenlearning.com/boundless-algebra/

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: Understanding the definition of a function; graphical representation of a function and vertical line test; visualising various kinds of functions (Linear, quadratic andcubic functions)

Weeks III and IV: Reciprocal, exponential and logarithmic functions; Interpretingandvisualising the concept of slope of a function through graphical representations.

Weeks V and VI: Scatter Diagrams; Correlation analysis - measure and interpretationofcorrelation coefficient and coefficient of determination.

Weeks VII to IX: Hypotheses, model specification and testing; Understanding Bi- variateRegression analysis: Method of Least Squares; Curve of best fit as a model forprediction.

Weeks X and XI: Multiple Regression Analysis

Weeks XII to XIV: Project Presentations and Viva

Examination scheme and mode:

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