

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

1. Name of the Academic Unit: Department of Humanities & Social Sciences

2. Subject Name: Statistics for Economics

L-T-P: 3-1-0 Credits:4

3. Pre-requisites: None

4. Syllabus and reference books:

Syllabus:

1. Introduction & Descriptive Statistics

Definition of Statistics; Functions of Statistics; Importance and Limitations of Statistics; Primary and Secondary Data; Time Series, Cross-Sectional and Panel Data; Qualitative and Quantitative Data; Discrete and Continuous Data; Tabular and Diagrammatic Representation of Data.

Frequency Distribution; Histogram, Ogives; Frequency Curve; Arithmetic and Geometric Mean; Median; Mode; Absolute and Relative Measures of Dispersions; Lorenz Curve; Gini Coefficient; Box and Whiskers Plot; Pie Diagram, Measures of Skewness and Kurtosis; Bivariate Frequency Distribution; Ordinary and Rank Correlation Coefficient.

2. Probability Distributions

Bernoulli Distribution, Binomial Distribution, Poisson Distribution, Geometric Distribution, Normal Distribution, Chi-square Distribution, t-Distribution, F-Distribution; Bi-variate Normal Distribution, Moment Generating Function; Moments of Various Distributions

3. Markov Chains

Transition matrix. Steady State probabilities. Recurrent states & Transient states. Absorption time & Absorption probabilities.

4. Estimators and Inference

Markov's Inequality & Chebyshev's Inequality. Weak Law of large numbers. Central limit Theorem. Point & Interval Estimation. Neyman Pearson Lemma. Maximum Likelihood Estimation of Bernoulli Distribution, Binomial Distribution, Poisson Distribution, Normal Distribution; Properties of Maximum Likelihood Estimator; Fischer Information Matrix; Asymptotic Distribution; Random Vectors and Multivariate analysis.

5. Dimensionality reduction (Principal Component Analysis)

Symmetric Matrix; Eigenvalue; Eigenvector; Diagonalization of Symmetric Matrix, Principal Component Analysis.

6. Index Number (Lecture Hours: 05)

Introduction; Problem in Construction of Price Index Number; Wholesale Price Index Number; Cost of Living Index Number; Uses of Price Index Numbers; Base Change, Inflation rate; application of Price Index Number.

Reference Books:

- 1) Statistical Methods by N. G. Das, McGraw Hill Education, 2017.
- 2) Fundamentals of Statistics by A.M. Gun, M.K. Gupta and B. Dasgupta, Volume 1, World Press, 2016.
- 3) Fundamentals of Statistics by A.M. Gun, M.K. Gupta and B. Dasgupta, Volume 2, World Press, 2016.
- 4) Probability and statistical Inference by Robert Hogg and Elliot Tanis, Pearson, 2013.
- 5) Introduction to Probability & Statistics by Sheldon Ross.
- 6) Statistical Tools and Techniques, 7th edition by Prasanta Kumar Giri, and Jiban Banerjee, Academia Publishers, 2021.

5. Lecture-wise break-up:

Sl. No.	Topic	No. of lectures
1.	Introduction & Descriptive Statistics	04
2.	Probability Distributions	14
3.	Markov Chains	04
4.	Estimators and Inference	10
5.	Dimensionality reduction (Principal Component Analysis)	05
6.	Index Number	05
al number of hours		42