

Course Code	Course Name	Credits
26EC503	ADVANCE QUANTITATIVE TECHNIQUE-I	04

Course Objectives

The course aims to,

- Understand: To enable students to explain and understand the concept and relationship between variables using regression and correlation techniques.
- To develop the ability to analyze non-linear equations and its different types.
- To explain and apply the uses and different methods of sampling in statistical studies.
- To enable understand the concept of probability and its application
- Analyze& Evaluate: To analyze and evaluate the basic concepts of hypothesis formulation using different statistical tools and different estimators used in economic theory.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Explain and apply the principal steps involved in regression and correlation analysis
- Describe and interpret various probabilities theory and its related theorem
- Transform and analyze various statistical tools for hypothesis testing and estimation of economic theory.
- Explain and apply the concept of probability in different real-life contexts.
- Formulate, test, and evaluate hypotheses for drawing valid future inferences.

Unit 1 – Correlation and Regression (12Hrs)

Correlation- Meaning and scope; Karl Pearson's coefficient of correlation; rank correlation; partial and multiple correlations; Regression- meaning and types; regression analysis. Partial and multiple regressions.

Unit 2 – Non-Linear Equation (12Hrs)

Methods of estimation of non-linear equations, Parabolic Equation, Exponential Series, Geometric and Logarithmic series; Gompertz and Logistic relationships.

Unit 3 – Sampling and Sampling Method (12Hrs)

Sampling and Sampling methods; Sampling and non-sampling errors, Law of large number and central limit theorem, Sampling Distributions and their characteristics.

Unit 4 –Probability and Probability Distribution (12Hrs)

Probability theory- classical, relative and subjective probability, addition and multiplication probability, conditional probability and Bayes' theorem, probability distribution; Binomial distribution- characteristics and application; Poisson distribution- characteristics and applications; Normal distribution- characteristics and applications.

Unit 5 –Statistical Estimation and Hypothesis Testing (12Hrs)

Point and Interval estimation of population mean; Standard error of Estimate; proportion and variance, Statistical testing of hypothesis and errors; Large and small sampling tests- Z, t and F tests; Non-parametric Tests- Chi-square test.

Reference Books:

1. Fundamentals of Mathematical Statistics- S.C Gupta & V.K Kapoor, Sultan Chand & Sons Publication, 11th Revised Edition (2002).
2. Statistical Methods- S.P Gupta, Sultan Chand & Sons, 42nd Revised Edition (2012).
3. Mathematics & Statistics for Economics- G.S Monga, Vikas Publishing House Pvt,Ltd, 2nd Revised Edition (2009).
4. An Introduction to Mathematical Statistics and its Application- Richard J. Larsen & Morris L.Marx, Prentice Hall. (2011).
5. Comprehensive Statistical Methods: P.N Arora, SumeetArora, S.Arora, S.Chand& Company, 4th Revised Edition (2012).

Websites and eLearning Sources:

1. <https://www.geeksforgeeks.org/maths/introduction-to-statistics/>
2. <https://www.statskingdom.com/>
3. <https://www.socscistatistics.com/>
4. <https://www.researchgate.net/publication/386449263>

COs and Bloom's Taxonomy Mapping – 26EC503

Course Outcomes	On successful completion of this course, students will be able to	BTL
CO1	Understand and apply concepts of correlation and regression, types of correlation including partial and multiple relationships.	K2
CO2	Analyze and estimate non-linear equations and growth models such as exponential, logarithmic, Gompertz, and logistic relationship	K4
CO3	Explain sampling techniques, sampling distributions, and related theoretical foundations and their characteristics.	K2
CO4	Apply probability concepts and standard probability distributions (Binomial, Poisson, and Normal) and its application in real-life problems	K3
CO5	Perform statistical estimation and hypothesis testing using parametric and non-parametric tests using some important statistical tools	K4, K5

BTL (Bloom's Taxonomy Level) - K1 – Remembering, K2 – Understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6 - Create

Relationship Matrix – 26EC503

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	2	3	1	1	1	2	2	3	2	2.09
CO2	3	3	3	3	1	1	3	3	1	2	2	2.27
CO3	3	3	2	3	2	1	1	3	2	3	2	2.27
CO4	3	3	2	3	2	1	2	3	3	2	2	2.36
CO5	3	3	3	3	2	2	3	3	3	3	2	2.72
Total												2.34

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

