Semester	**Seven**
Course	**Minor**
Paper Code	
Paper Title	**Applied Statistics**
No. of Credits	**4**
Theory/Composite/ Practical	**Composite**
Minimum No. of preparatory hours per week a student has to devote	**3 Theory+ 2 Practical**
Number of Modules	**1**
Syllabus	**Unit 1:** ***Sample Survey***: Concepts of a finite population and a sample. Need for sampling. Complete enumeration and sample surveys. Probability and non-probability sampling. Sampling and non-sampling error. Simple random sampling with and without replacement. Associated unbiased estimators of population mean and proportion, their variances and variance estimators. [12L] **Unit 2:** ***Index Numbers***: Price indices. Choice of weights. Laspeyres', Paasche's and Fisher's index numbers. Errors in index numbers. Tests of index numbers. Cost of living index number. Uses of price index numbers. [10L] **Unit 3:** ***Time Series:*** Introduction to time series. Examples of time series from different fields. Time series data. Components of a time series: trend, seasonal, cyclical and irregular fluctuations. Classical decomposition of a time series. Additive and multiplicative models for decomposition. Determination of trend: method of mathematical curve fitting (linear and quadratic trend), method of moving averages. [8L] **Unit 4:** **Analysis of variance (ANOVA)**: Analysis of one-way and two-way classified data (equal observation per cell) - fixed effects model. [9L]
Learning Outcomes	1. Apply sampling techniques and evaluate unbiased estimators to design appropriate survey strategies for real-world populations. 2. Compute and compare different index numbers, evaluate their suitability, and develop composite indices for economic and business applications.

	3. Analyze time series data to differentiate components, apply decomposition methods, and formulate forecasting models. 4. Implement one-way and two-way ANOVA to draw valid statistical conclusion	
Reading/Reference List	1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. II, 8th Edn. The World Press, Kolkata. 2. Chatfield, C., & Xing, H. (2019). *The analysis of time series: an introduction with R*. Chapman and hall/CRC. 3. Murthy, M.N. (1977): Sampling Theory & Statistical Methods, Statistical Pub. Society, Calcutta. 4. Mukhopadhyay, P. (2011): Applied Statistics, 2nd edition revised reprint, Books and Allied(P) Ltd.	
List of Practical	1. Simple Random Sampling with and without replacement 2. Construction of Price Index Numbers and Cost of Living Index Number. 3. Estimation of Trend in time series 4. Analysis of Variance of a one way and two way classified data.	
Evaluation	Theory CIA: 15 Semester Exam: 45	Practical : 40 Continuous assessment
Paper Structure for Semester exam	Short Questions (5 marks each) 3 out of 5	Long Questions (15 marks each) 2 out of 3