

Course Code	Course Title	L	T	P	C
OLMDS504	Statistical Inference	3	1	0	4
Pre-requisite	NIL	Syllabus Version			
		1.0			
Course Objectives:					
1. Understand the types of questions that the statistical method addresses for decision making. 2. Apply statistical methods to hypotheses testing and interpret the results in a way that addresses the problem of interest. 3. Use data to make evidence-based decisions that are technically sound.					
Course Outcomes:					
At the end of the course students will be able to: 1. Understand the notion of a parametric model and properties of a good estimator. 2. Understand the various methods of point estimation and interval estimations 3. Understand and apply large-sample tests. 4. Use small-sample tests of hypotheses. 5. Use non-parametric tests of hypotheses.					
Module:1	Introduction to Estimation				
Population, sample, parameter and statistic; characteristics of a good estimator; Consistency – Invariance property of Consistent estimator, Sufficient condition for consistency; Unbiasedness; Sufficiency, Efficiency – Most efficient estimator, likelihood equivalence, Uniformly minimum variance unbiased estimator.					
Module:2	Point Estimation				
Methods of point estimation – Maximum likelihood method, method of minimum variance, method of moments, method of least squares; simple problems					
Module:3	Interval Estimation				
Methods of Interval estimation - Confidence limits and confidence coefficient, Construction of confidence intervals for population parameters; simple problems.					
Module:4	Testing of Hypothesis				
Null Hypothesis, Alternative Hypothesis, Type I and II errors, power of a test, most powerful tests; simple problems; Statement of Neyman-Pearson Fundamental Lemma and its applications; Notion of Uniformly most powerful tests.					
Module:5	Large sample tests				
Large sample properties; Tests of significance - Test for a single population mean and two means, single proportion and two proportions.					
Module:6	Small sample tests				
Student's t-test for single mean and two means; paired samples; F-test for equality of population variances; Chi-square test for goodness of fit and independence of attributes. Test for variance, Test for correlation coefficient and Regression coefficient.					
Module:7	Non Parametric Tests				
Sign test, Signed rank test, Median test, Mann-Whitney test, Run test and One sample Kolmogorov –Smirnov test, Kruskal – Wallis H test - Description, properties and applications.					
	Total Lecture Hours				120 hours
Text Book(s)					

1.	Robert V Hogg, Elliot A Tannis and Dale L.Zimmerman, Probability and Statistical Inference, 10th Ed., Pearson publishers, 2021.		
2.	Manoj Kumar Srivastava and Namita Srivastava, Statistical Inference – Testing of Hypotheses, Prentice Hall of India, 2014.		
Reference Book(s)			
1.	Marc S. Paoella, Fundamental statistical inference: A computational approach, Wiley, 2018.		
2.	B. K. Kale and K. Muralidharan, Parametric Inference, Narosa Publishing House, 2016.		
3.	Miller, I and Miller, M, John E. Freund's Mathematical statistics with Applications, Pearson Education, 2002.		
4.	Rajagopalan M, Dhanavanthan P, Statistical Inference, PHI Learning, 2012.		
Mode of Evaluation: Quiz/Assignment/Mid-Term, FAT			
List of Tutorials			
1	Evaluating the Confidence intervals and p -value		
2	Large Sample Tests- Test for Population mean and Population proportions		
3	Test for Correlation and Regression coefficients		
4	t – test for population mean, Paired t test and F-test		
5	Chi-square test for goodness of fit and Independence of Attributes		
6	Non-parametric Tests		
Mode of evaluation: Continuous assessment and FAT.			
Recommended by Board of Studies	27-07-2022		
Approved by Academic Council	No. 67	Date	08-08-2022