

**SVKM's Narsee Monjee College of Commerce & Economics(Autonomous)**

<b>Program: BCom (Economics and Analytics)</b>				<b>Semester : III</b>	
<b>Course : Applied Statistics</b> <b>AY: 2024-25</b>				<b>Code:</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>	
<b>Lectures</b>	<b>Practicals</b>	<b>Tutorials</b>	<b>Credits</b>	<b>Internal Continuous Assessment (ICA) (weightage)</b>	<b>Term End Examinations (TEE) (weightage)</b>
<b>60</b>	<b>Nil</b>	<b>Nil</b>	<b>04</b>	<b>40 Marks</b>	<b>60 Marks</b>
<b>Internal Component</b>					
<b>Class Test (Duration 20 minutes)</b>			<b>Projects / Assignments</b>	<b>Class Participation</b>	
<b>20 Marks</b>			<b>20 Marks</b>	<b>NA</b>	
<b>Learning Objectives:</b>					
<ul style="list-style-type: none"> <li>• To describe the sampling distribution of the sample, mean and proportion.</li> <li>• To apply steps of test procedure for a test of hypothesis concerning a population mean and variance when the sample size is large.</li> <li>• To identify the appropriate sampling distribution for a sample hypothesis test when the sample size is small.</li> <li>• To interpret correlation and linear regression.</li> </ul>					
<b>Learning Outcomes:</b>					
<ul style="list-style-type: none"> <li>• Learner will be able to calculate approximate probabilities for sample means and sample proportions.</li> <li>• Learner will be able to understand and explain the purpose of hypothesis testing to determine the difference between a population mean and a sample mean for large sample.</li> <li>• Learner will be able to conduct and interpret the results of hypothesis tests for a sample mean and proportion for small sample.</li> <li>• Learner will be able to calculate and interpret the correlation and regression coefficient.</li> </ul>					
<b>Pedagogy:</b> Lecture, PowerPoint Presentations, Video Clips, Case Studies, Role Plays, Group Discussion					
<b>Detailed Syllabus: (per session plan )</b>					
<b>Session Outline for : Applied Statistics</b>					
<b>Each lecture session would be of one hour duration (60 sessions)</b>					

<b>Module</b>	<b>Module Content</b>	<b>Module Wise Pedagogy Used</b>	<b>Module Wise Duration</b>
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I	<p><b>Introduction to sampling distribution:</b> Introduction, Population and Sample, Introduction to sampling, Types of sampling – Probability and non-probability sampling, Simple, systematics, stratified, and cluster sampling, Convenience sampling, judgement sampling, Quota sampling, Shopping mall intercept sampling. Advantages of Sampling, Sampling Error, Sampling distribution of the mean, central limit theorem, sampling from Normal population, sampling distribution of a proportion, sampling error.</p>	Lecture and discussion	15 Lectures
II	<p><b>Statistical Estimation theory:</b> Introduction, types of estimate-point estimate, interval estimate, criteria for good estimator, point estimate of population variance and population proportion, calculating interval estimate of the mean and proportion from large samples, confidence interval.</p> <p><b>Statistical Decision Theory:</b> Statistical hypothesis – Null and alternative hypothesis, level of significance, critical value, Type I and Type II error, degree of freedom, steps in finding hypothesis-testing procedure, One-tailed and two tailed tests of hypothesis, Large sample test for single mean, differences of mean, difference between two standard deviations.</p>	Lectures, Case Studies	15 Lectures
III	<p><b>Statistical Inference:</b> Small sample test- Student's t-distribution, properties, application, testing the significance of mean of a random sample, difference between means of two samples (Independent samples), difference between means of two samples (dependent samples or paired observations).</p> <p>Chi-square test- Introduction, Observed and expected frequencies, degree of freedom, application, Goodness of fit, contingency table, independent of attributes.</p> <p>F-distribution: Introduction, degrees of freedom, Hypothesis Tests on the Ratio of Two Variances.</p>	Lecture and Case Studies, Group Discussion	15 Lectures
IV	<p><b>Correlation Theory:</b> Scatter plot, Types of correlation-positive, negative, simple, partial, multiple, linear, non-linear, merits and limitations, Correlation coefficient- Karl Pearson coefficient of correlation, Rank correlation coefficient-Spearman correlation coefficient.</p> <p><b>Regression Analysis:</b> Method of least squares, Linear regression, regression coefficients, regression coefficient properties, regression lines- x on y and y on x, limitations of regression analysis.</p>	Lecture and Case Studies	15 Lectures

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### Reference Books

1. Statistics for Management, Richard Levin, S. Rubin, 7<sup>th</sup> edition, Sanjay Rastogi, Masood Husain Siddiqui, Pearson (2016).
2. Statistics for Business & Economics, 13<sup>th</sup> edition, David R. Anderson, Thomas A. Williams, Dennis J. Sweeney, James J. Cochran Cengage learning.
3. Essentials of Business Analytics, 1st Edition, Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, David R. Anderson, Dennis J. Sweeney, Thomas A. Williams. Cengage learning.
4. Business Analytics data analysis and decision making Albright, Winston, edition CENGAGE Learning.

### EVALUATION PATTERN

The performance of the learner will be evaluated in two components. The first component will be a Continuous Assessment with a weightage of 25% of total marks per course. The second component will be a Semester end Examination with a weightage of 75% of the total marks per course. The allocation of marks for the Continuous Assessment and Semester end Examinations is as shown below:

#### a) Details of Continuous Assessment (CA)

Continuous Assessment	Details	Marks
Component 1 (ICA-1) – Theory subjects	Internal class test 1 and 2	20 marks
Component 2 (CA-2)	Assignments/Presentations Etc.	20 marks

#### b) Details of Semester End Examination

75% of the total marks per course. Duration of examination will be two and half hours

Question Number	Description	Marks	Total Marks
Q1.	Answer any 2 from the following (Module I) a. b. c.		15
Q2.	Answer any 2 from the following: (Module II) a. b. c.		15

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<b>Q3.</b>	<b>Answer any 2 from the following:</b> (Module III) a. b. c.		15
<b>Q4.</b>	<b>Answer any 2 from the following:</b> (Module IV) a. b. c.		15
<b>TOTAL MARKS</b>			<b>60</b>