

Programme	BSc Statistics				
Course Code	STA3MN209 (P)				
Course Title	Statistical inference				
Type of Course	Minor				
Semester	III				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic knowledge of random variable, probability, standard distributions				

Course Summary	Equip students with a comprehensive understanding of sampling theory and its applications in statistical inference.
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**Course Outcomes (CO):**

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define parameters and statistics, and differentiate between them using examples to illustrate their roles in statistical inference.	U	C	Instructor-created exams / Quiz
CO2	Explain what a sampling distribution is and differentiate it from a population distribution.	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Describe the procedures for statistical estimation, including point estimation and interval estimation, and analyze data to help entrepreneurial decisions using critical thinking skills.	U	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Identify unbiased and efficient estimators and apply them to estimate population parameters such as the mean, proportion, and variance.	U	C	Instructor-created exams / Home Assignments
CO5	Interpret interval estimators for population mean and population proportion and critically evaluate ethical implications of statistical methods aligning with human values.	Ap	P	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Perform testing of hypothesis using any software.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

**COURSE CONTENT**

Mo	Units	Content	Hrs	Marks
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<b>du</b>			<b>(45</b>	<b>(70)</b>
<b>e</b>			<b>+30)</b>	
	<b>SAMPLING THEORY</b>		<b>10</b>	<b>10</b>
<b>1</b>	<b>1</b>	Parameter and statistic	2	
	<b>2</b>	Sampling Distribution	2	
	<b>3</b>	Principles of sampling	2	
	<b>4</b>	Sampling distribution of a statistic	2	
	<b>5</b>	Central limit theorem	2	
	<b>Sections from References:</b> Unit 1: 15.4 [Ref 1] Unit 2: 15.4.1, 15.4.2 [Ref 1] Unit 3: 15.5 [Ref 1] Unit 4: 16.3 [Ref 1] Unit 5: 16.3.2 [Ref 1]			
	<b>THEORY OF ESTIMATION</b>		<b>11</b>	<b>25</b>
<b>2</b>	<b>6</b>	Statistical Estimation Procedures-Point Estimation and Interval estimation	2	
	<b>7</b>	Point estimation- Estimator and Estimate (Definition, Concept), Unbiases Estimator and Efficient Estimator, Point Estimators of Population Mean, Population Proportion, Population Variance	3	
	<b>8</b>	Interval estimation-Definition	3	
	<b>9</b>	Size of the random sample for specified precision	3	
	<b>Sections from References:</b> Unit 6: 16.2 [Ref 1] Unit 7: 16.2.1, 16.2.2, 1.62.3, 16.2.4, 16.2.5 [Ref 1] Unit 8: 16.4, 16.4.1, 16.4.2, 16.4.3 [Ref 1] Unit 9: 16.5 [Ref 1]			
	<b>HYPOTHESIS TESTING</b>		<b>12</b>	<b>20</b>
<b>3</b>	<b>10</b>	Testing of hypothesis, simple and composite hypothesis, null and alternate hypothesis	2	

	<b>11</b>	Types of errors, Size and power of tests, critical region	2	
	<b>12</b>	One tailed and two tailed tests	1	
	<b>13</b>	P- value or probability value of test statistic	1	
	<b>14</b>	Large sample tests	2	
	<b>15</b>	Test for single proportion	2	
	<b>16</b>	Test for single mean	2	
	<b>Sections from References:</b>			
	Unit 10: 16.6, 16.6.1, 16.6.3, 16.6.4 [Ref 1]			
	Unit 11: 16.6.5, 16.6.6, 16.6.7 [Ref 1]			
	Unit 12: 16.6.8 [Ref 1]			
	Unit 13: 16.6.10 [Ref 1]			
	Unit 14: 17 [Ref 1]			
	Unit 15: 17.2.1 [Ref 1]			
	Unit 16: 17.3.1 [Ref 1]			
	<b>CHI SQUARE TEST</b>		<b>12</b>	<b>15</b>
	<b>17</b>	Probability density function of Chi- square distribution	1	
	<b>18</b>	Applications of Chi square distribution	2	
	<b>19</b>	Chi square test of goodness of fit	3	
	<b>20</b>	Conditions for the validity for Chi square test	2	
	<b>21</b>	Chi square test for independence of attributes	3	
	<b>22</b>	Degrees of freedom	1	
<b>4</b>	<b>Sections from References:</b>			
	Unit 17: 18.2.1 [Ref 1]			
	Unit 18: 18.3 [Ref 1]			
	Unit 19: 18.4 [Ref 1]			
	Unit 20: 18.5 [Ref 1]			
	Unit 21: 18.6 [Ref 1]			



3												
CO 4	1	-	-	-	-	3	-	-	-	-	-	3
CO 5	-	3	2	2	-	-	-	-	2	-	-	-
CO 6	-	-	3	-	-	3	-	-	-	2	3	-

**Correlation Levels:**

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

**Assessment Rubrics:**

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

**Mapping of COs to Assessment Rubrics :**

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓	✓		✓
CO 3	✓			✓

CO 4		✓		✓
CO 5	✓	✓		✓
CO 6	✓			

Programme	BSc Statistics				
Course Code	STA1MN110 (P)				
Course Title	Basic statistics and data visualization				
Type of Course	Minor				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic mathematical knowledge, skills in logical thinking and problem solving				