Course Title	**Mathematical Statistics II**
Course Code	**AMT 212 2.0**
Credit Value	02
Status	Core
Year / Level	Year 2
Semester	Semester 1
Theory: Practical: Independent Learning	26:00:66
Other: Pre-requisite Course/s	AMT 112 2.0 Mathematical Statistics I

Aim of the Course:

To provide a basic understanding about statistical inference and its role in day today life by introducing parametric and non-parametric inference, familiarizing students with the concepts of estimation, hypothesis testing and some properties of estimators.

Intended Learning Outcomes:

On the successful completion of this course, the student should be able to:

1) explain the terms in inference and use proper notations in writing;
2) explain the rationale behind estimation methods and derive estimators to get estimates;
3) derive and compute confidence intervals to interpret;
4) Formulate hypotheses, conduct both parametric and non-parametric tests, interpret results and make conclusions.

Course Content:

Method of moments, Method of maximum likelihood, Introduction to Method of least squares
Bias, Unbiasedness, Mean Square Error, Variance, Standard Error, Consistency
Confidence Intervals for Means, Proportions and Variances
Null and Alternative Hypotheses, Type I error and Type II error, Significance level, size and power of a test
Parametric tests concerning means, proportions and variances
Introduction, One sample Tests, Tests for two related samples, Tests for two independent samples
Tests for k related samples, Tests for k independent samples, Tests for correlation

Scope and Schedule of Teaching - Learning Activities:

Session No.	Topic / Sub Topic	No. of Hrs.			Teaching Method	Assessment Criteria	ILO Alignment
		T	P	IL			
1	**1 Estimation** 1.1 Introduction 1.2 Method of moments	2	0	6	Lecture / Chapter 1		1,2
2	1.3 Method of maximum likelihood	2	0	4	Lecture / Chapter 1		1,2
3	1.4 Methods of evaluating estimators Bias, MSE, Consistency 1.5 Interval estimation for means, proportions, variances	2	0	4	Lecture / Chapter 1		1,2
4	1.6 Pivotal Quantity Method	2	0	4	Lecture / Chapter 1		1,2,3
5	**2 Statistical hypotheses** 2.1 Formulate hypotheses 2.2 Type I/II errors 2.3 Significance Level, Size and the Power of a Test	2	0	6	Lecture / Chapter 2		1,2,3
6	2.4 Hypothesis Testing Methodology 2.5 Methods for Making Decisions	2	0	6	Lecture / Chapter 2		1,4
7	2.6 Parametric Methods of Testing Hypothesis	2	0	4	Lecture / Chapter 2		1,2,3,4
8	**Mid-Semester Examination**	0	0	0	Mid-Sem. Examination	30% of Final Marks	
9	**3 Non parametric methods** 3.1 Introduction 3.2 One sample tests	2	0	6	Lecture / Chapter 3		1,2,3,4
10	3.3 Tests for two related samples	2	0	4	Lecture / Chapter 3		1,2,3,4
11	3.4 Tests for two independent sample	2	0	4	Lecture / Chapter 3		1,2,3,4
12	3.5 Tests for K related sample	2	0	6	Lecture / Chapter 3		1,2,3,4
13	3.6 Tests for K independent sample	2	0	6	Lecture / Chapter 3		1,2,3,4
14	3.7 Test for correlation	2	0	6	Lecture / Chapter 3		
	Total	*26*	*0*	*66*			

Linking Program Outcomes with ILOs:

Programme Learning Outcomes:

1. Demonstrate competency in theoretical knowledge and practical and/or technical skills in respective subject areas.
2. Communicate efficiently and effectively in the respective subject areas using written, oral, visual and/or electronic forms.
3. Facilitate, and participate as an empathetic and emotionally intelligent team player with leadership qualities, in a group, diverse team or organization.
4. Apply subject based knowledge and skills creatively in making appropriate judgments in changing situations.
5. Integrate creativity and innovation to achieve entrepreneurial competencies.
6. Implement solutions in keeping with ethical, societal and environmental norms and need for sustainable development.
7. Secure life goals through lifelong learning with the aim of strengthening professional skills, and ensuring the betterment of the community.

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
ILO 1	***	**		*			**
ILO 2	***	**		**		*	**
ILO 3	***	**		**			**
ILO 4	***	**	*	**	*	*	***

**** - Strongly Linked; ** - Medium linked; * Weakly linked*

Mode of Assessment:

Formative Assessment (FA): FA1 30% = 30% of Total Marks

Summative Assessment (SA): End Semester Examination: 2-hour paper = 70% of Total Marks

References

- Introduction to the Theory of Statistics – Alexander M. Mood, Franklin A. Graybill, Duane C. Boes
- Probability and Statistical Inference – Hogg
- Any other books on Statistical Inference