University of Kerala

Discipline	STATISTICS				
Course Code	UK1DSCSTA109				
Course Title	DESCRIPTIVE STATISTICS AND PROBABILITY				
Type of Course	**DSC**				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5
Pre-requisites					

COURSE OUTCOMES

Up on Completion of the course, students should be able to:		Cognitive level	PSO addressed
CO1	Distinguish between the various data types	Understand	PSO-1, 2
CO2	Explain the concept of scaling and identify their significance in practical situations	Understand	PSO-1,2
CO3	Calculate the measures of Central tendency, dispersion, skewness and kurtosis	Apply	PSO-1,2,3,4
CO4	Explain the concepts of random experiments, sample space and different types of events	Understand	PSO-1,2
CO5	Calculate the probabilities of events using classical, statistical approaches.	Apply	PSO-1,2,3
CO6	Understand Axiomatic approach	Understand	PSO-1,2
CO7	Determine conditional probability and apply concepts of statistical independence and multiplication theorem	Apply	PSO-1,2,3
CO8	Use Bayes' theorem to evaluate posterior probabilities	Apply	PSO-1,2,3
CO9	Explain the concept of random variables	Understand	PSO-1,
CO10	Illustrate random variables and its probability distributions	Analyse	PSO-1,2,3

COURSE CONTENT

Module	Content	Hrs
I	**Descriptive Statistics**	**13**
	Descriptive Statistics: Data- Definition, types of data, types of scaling - nominal, ordinal, interval and ratio, Central Tendency- Concept and Measures, Dispersion – Concept & Measures of Dispersion, Raw and central Moments(first four moments and their relationship without proof), Skewness and Kurtosis (Concept and definition with problems only).	

II	**Introduction to Probability**	**12**
	Random experiments - Sample Space, Sample point; Events-algebra of events, equally likely, mutually exclusive and exhaustive events (Concept only). **Probability**: Statistical regularity, frequency definition, classical approaches (numerical problems), Axiomatic approach, theorems in probability (Concepts and statement of results, numerical problems), probability space.	
III	**Conditional probability**	**10**
	Conditional probability: multiplication theorem, independence of two and three events, compound probability, Bayes' theorem and its applications. (Concepts and statement of results, numerical problems).	
IV	**Random variables**	**10**
	Random variables – definition, discrete and continuous random variables, probability mass function and probability density function, distribution function. Expectation of random variables and its properties, moments, moment generating function and characteristic function.(No proofs needed)	
V	**Practicum**	**30**
	Practical based on Modules I to be done using **R package**	

PRACTICAL/LABWORK

List of Practical worksheet

1. Measures of Central tendency.
2. Measures of Dispersion
3. Skewness and Kurtosis

REFERENCES

1. Agarwal, B.L. (2006). Basic Statistics. 4th Edition, New Age international (P) Ltd., New Delhi.
2. Gupta S. P. (2004). Statistical Methods. Sultan Chand & Sons, New Delhi.
3. Gupta, S. C., and Kapoor, V. K. (1994). Fundamental of Mathematical Statistics. Sultan Chand & Sons, New Delhi.
4. Kenny J. F (1947). Mathematics of Statistics Part One. 2nd Edition, D. Van Nostard Company, New Delhi-1.
5. Kenny J. F & Keeping E. S (1964). Mathematics of Statistics –Part Two. 2nd Edition, D. Van Nostard Company, New Delhi-1.
6. Mukhopadhyay, P. (1996). Mathematical Statistics. New Central Book Agency (P) Ltd, Calcutta.

Name of the Course: DESCRIPTIVE STATISTICS AND PROBABILITY

Credits: 3:0:1 (Lecture:Tutorial:Practical)

CO No.	**CO**	**PO/PSO**	**Cognitive Level**	**Knowledge Category**	**Lecture (L)**	**Practical (P)**
CO 1	Distinguish between the various data types	PSO-1, 2 PO 1	Understand	F, C	L	
CO 2	Explain the concept of scaling and identify their significance in practical situations	PSO-1,2 PO 1,2	Understand	F,C	L	

CO 3	Calculate the measures of Central tendency, dispersion, skewness and kurtosis	PSO-1,2,3,4 PO 1,7	Apply	C,P	L	P
CO 4	Explain the concepts of random experiments, sample space and different types of events	PSO-1,2 PO 1,2	Understand	C	L	
CO 5	Calculate the probabilities of events using classical, statistical approaches.	PSO-1,2,3 PO 1,2	Apply	P ,C	L	
CO 6	Understand Axiomatic approach	PSO-1,2 PO 1,2	Understand	F,C	L	
CO 7	Determine conditional probability and apply concepts of statistical independence and multiplication theorem	PSO-1,2,3 PO 1,2	Apply	C,P	L	
CO 8	Use Bayes' theorem to evaluate posterior probabilities	PSO-1,2,3 PO 1,2	Apply	C,P	L	
CO 9	Explain the concept of random variables	PSO-1 PO 1,2	Understand	F,C	L	
CO 10	Illustrate random variables and its probability distributions	PSO-1,2,3 PO 1,2	Analyse	C,P	L	

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with POs :

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PO1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	1	2				1							
CO 2	1	2				1	2				2	1	

CO 3	2	1	2	1		2						1	
CO 4	2	2				1	2						
CO 5	2	1	1			1	2						
CO 6	2	1				1	2						
CO 7	3	1	1			1	2						
CO 8	3	1	1			1	2						
CO 9	3					1	2						
CO 10	2	1	1			1	2						

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Internal Examination
- Practical Evaluation
- End Semester Examinations

Mapping of COs to Assessment Rubrics :

	Internal Exam	Quiz / Assignment Discussion / Seminar	Practical Evaluation	End Semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓		✓
CO 5	✓	✓		✓
CO 6	✓	✓		✓
CO 7	✓	✓		✓
CO 8	✓	✓		✓
CO 9	✓	✓		✓
CO 10	✓	✓		✓