



## University of Kerala

Discipline	STATISTICS				
Course Code	UK2DSCSTA109				
Course Title	STANDARD DISTRIBUTIONS, CORRELATION AND REGRESSION				
Type of Course	<b>DSC</b>				
Semester	II				
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	Explain Discrete Standard Distributions and apply discrete standard distributions in practical situations	Apply	PSO 1,2,3,4
CO2	Explain Continuous Standard distribution and its practical applications	Apply	PSO 1,2,3,4
CO3	Evaluate Marginal and Continuous distributions of Bivariate Random Variables. Check for the independence of random variables.	Evaluate	PSO 1,2, 3
	Calculate the conditional mean of Bivariate Random Variables.	Evaluate	
CO4	Calculate Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient and interpret the results.	Apply	PSO 1,2,3,4,5

### COURSE CONTENT

Module	Content	Hrs
<b>I</b>	<b>Discrete Standard distributions</b>	<b>15</b>
	Standard distributions (Discrete) – Uniform, Binomial, Poisson – Moments, moment generating function, characteristic function, problems, additive property	

	(Binomial and Poisson), Recurrence relation for moments (Binomial and Poisson) , Poisson as limiting form of Binomial(statement only), fitting of Binomial and Poisson distribution.	
<b>II</b>	<b>Normal and Standard Normal distributions</b>	<b>10</b>
	Normal and Standard Normal distributions– uses, properties, mean, rth central moment, moment generating function, characteristic function, numerical problems, convergence of Binomial and Poisson to Normal	
<b>III</b>	<b>Bivariate random variables</b>	<b>10</b>
	Bivariate random variables – Joint Distribution of two random variables, Marginal and Conditional distributions, independence, conditional expectation, Bivariate Moments, Addition and multiplication theorems of Expectation, numerical problems	
<b>IV</b>	<b>Bivariate data Analysis</b>	<b>10</b>
	Correlation: Scatter Diagram, Karl Pearson’s Coefficient of Correlation, Spearman’s Rank Correlation Coefficient. Regression: Definition, Method of Least squares, Fitting of Regression Lines and predictions Fitting of models: $y = ae^{bx}$ , $y = ab^x$ and $y = ax^b$ , Coefficient of Determination	
<b>V</b>	<b>Practicum</b>	<b>30</b>
	Practical based on Modules I, II &IV. Practical is to be done using <b>R package</b>	

## PRACTICAL/LABWORK

### List of Practical worksheet

1. Fitting of Binomial and Poisson distribution
2. Problems based on Binomial, Poisson Normal distribution
3. Problems on Correlation
4. Problems on Curve fitting
5. Problems on regression lines

## REFERENCES

1. Gupta, S. C., and Kapoor, V. K. (1994). Fundamentals of Mathematical Statistics. Sultan Chand & Sons. New Delhi.
2. Mukhopadhyay, P. (1996). Mathematical Statistics. New Central Book Agency (P) Ltd, Calcutta.
3. Pitman, J. (1993). Probability. Narosa Publishing House, New Delhi.
4. Rohatgi V. K. (1993). An Introduction to Probability Theory and Mathematical Statistics. Wiley Eastern, New Delhi.
5. Purohit, S. G., Deshmukh, S.R., & Gore, S. D. (2008). Statistics using R. Alpha Science International, United Kingdom.

**Name of the Course: STANDARD DISTRIBUTIONS, CORRELATION AND REGRESSION**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial(T)	Practical (P)
CO1	Explain Discrete Standard Distributions and apply discrete standard distributions in practical situations	PO1,2,7	Apply	F, C	L	P
CO2	Explain Continuous Standard distribution and its practical applications	PO 1,2,7	Apply	P	L	P
CO3	Evaluate Marginal and Continuous distributions of Bivariate Random Variables. Check for the independence of random variables.  Calculate the conditional mean of Bivariate Random Variables..	PO1,2	Evaluate  Evaluate		L	
CO4	Calculate Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient and interpret the results.	PO1,2,3, 4,7	Apply		L	P

**Mapping of COs with PSOs and POs :**

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	1	1	1		2	1					1
CO 2	3	1	1	1		2	1					1
CO 3	3	1	1	1		1	1					
CO 4	1	3	2	1	2	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 Examinations
CO 1	✓	✓	✓	✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓