University of Kerala

Discipline	STATISTICS				
Course Code	UK2DSCSTA109				
Course Title	STANDARD DISTRIBUTIONS, CORRELATION AND REGRESSION				
Type of Course	**DSC**				
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	Calculate Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient and interpret the results, Identify regression lines for data sets	Create	PSO 1,2,3,4,5
CO2	Derive marginal and conditional distributions of Bivariate Random Variables. Check for independence of random variables	Evaluate	PSO 1,2, 3
CO3	Evaluate expectation, moments, moment generating functions.	Evaluate	PSO 1,2,3
CO4	Explain Discrete Standard Distributions and apply discrete standard distributions in practical situations, Fit binomial and Poisson distributions to data sets	Create	PSO 1,2,3,4
CO5	Explain Normal and Standard normal distributions, their properties, practical applications and evaluate normal probabilities	Evaluate	PSO 1,2,3,4

COURSE CONTENT

Module	Content	Hrs
I	**Bivariate data Analysis**	
	Bivariate data Analysis: Scatter Diagram, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient, Properties of Correlation (statements and numerical problems only). Regression: Definition, Two regression lines, Fitting of Regression Lines and predictions, Coefficient of Determination	
II	**Mathematical Expectation and Bivariate random variables**	
	Mathematical Expectation: Expectation of a single random variable and its properties (without proof) , raw moments and central moments, relation between raw moments and central moments (without proof), moment generating function and characteristic function- definition, properties (without proof) and problems. **Bivariate random variables:** Bivariate random variables –Joint Distribution of two random variables, properties (without proof), marginal and conditional distributions, independence of two random variables. Addition and multiplication theorems of Expectation (two random variables), Correlation (Statements and problems only)	
III	**Discrete Standard distributions**	**15**
	Discrete Standard distributions – Uniform, Binomial, Poisson – Moments, moment generating function, characteristic function, problems, additive property (Binomial and Poisson), Poisson as limiting form of Binomial, fitting of Binomial and Poisson distribution. (Statements and numerical problems only)	
IV	**Normal distribution**	**10**
	Normal distribution– Normal distribution and its uses, properties, mean, rth central moment, moment generating function, characteristic function, Standard Normal distribution- Definition, standard normal curve, numerical problems using standard normal table, convergence of Binomial and Poisson to Normal (Statements and numerical problems only)	
V	**Practicum**	**30**
	Practical based on Modules I, III &IV. Practical is to be done using **R package**	

PRACTICAL/LABWORK
List of Practical worksheet

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

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

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
CO1	Calculate Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient and interpret the results, Identify regression lines for data sets	PO 1,2,3,4,6, 7	**Create**		**L**	**P**
CO2	Derive marginal and conditional distributions of Bivariate Random Variables. Check for independence of random variables	PO1,2,7	Evaluate	F, C	L	
CO3	Evaluate expectation, moments, moment generating functions.	PO 1,2,3,6,7	Evaluate		L	
CO4	Explain Discrete Standard Distributions and apply discrete standard distributions in practical situations, Fit binomial and Poisson distributions to data sets	PO 1,2,3,6,7	Create		L	P
CO5	Explain Normal and Standard normal	PO 1,2,3,6,7	Evaluate		L	P

	distributions, their properties, practical applications and evaluate normal probabilities					

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	1	1	1	1	1	1	1	1	1		1	1
CO 2	1	1	1			1	1					1
CO 3	1	1	1			1	1	1			1	1
CO 4	1	1	1	1		1	1	1			1	1
CO 5	1	1	1	1		1	1	1			1	1

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	✓	✓	✓	✓