Course Code	UDS21G02T	Course Name	ROLE OF STATISTICS IN AI	Course Category	G	Generic Elective Course	L	T	P	C
							4	0	0	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department		Mathematics and Statistics	Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)

		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 : Create an understanding on the use of Statistical concepts applied in AI																			
CLR-2 : Give overview to Applications of Differential/Inferential Statistics in AI																			
CLR-3 : Clarify the concepts of Correlation and Regression, Distribution and Estimation used in AI																			
CLR-4 : Learn about the Hypothesis Testing and Methods of Sampling in AI																			
CLR-5 : Implementation of Statistics in Real Life Applications																			
CLR-6 : Apply Statistical concepts in AI																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 : Learning the importance of Statistics in AI Implementation		2	85	80	H	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-2 : Applying Statistics in AI and learning about Statistical Thinking and Descriptive Statistics		3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-3 : Understanding about Correlation and Regression and Theory of Estimation		3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-4 : Interpretation of hypothesis testin, Bivariate transformations and sampling methods		3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-5 : Knowledge of Stochastic processes, Linear Regression, Time Series Analysis		3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-6 : Realize Statistical concepts used in AI		3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H

Note: All our curriculum, study materials, assignments, quizzes, lab works, and learning resources are personalized and dynamically generated using machine learning models based on the learner's learning ability. Users can review our learning curriculum only through our intelligent learning management platform (iLMSP), and our learning resources and lab infrastructures are available only in the digital form on our cloud infrastructures.

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Unit 1: Statistics in AI	Unit 4: Applications of Differential/Inferential Statistics in AI	Unit 7: Correlation and Regression	Unit 10: Testing of Hypothesis	Unit 13: Stochastic processes
	SLO-2	Getting Started with Statistics for AI	Overview of Differential/Inferential Statistics in AI	Introduction and Correlation I	Getting started with Testing of Hypothesis	Introduction to Stochastic processes
S-2	SLO-1	Fundamentals of Statistics in AI	Differential Statistics	Correlation Coefficient II	Null Hypothesis	Random Variables and Distributions
	SLO-2	Overview of Descriptive Statistics	Inferential Statistics	Testing Correlation I	Alternate Hypothesis	Simple Stochastic Process

S-3	SLO-1	Correlation and Regression	Descriptive Statistics	Testing Correlation II	Testing Hypothesis	Staionary and Auto Regressive Processes
	SLO-2	Probability Theory Concepts	Differential Vs Inferential Statistics	Applications to Measurement	P Value	Discrete Time Markov Chain
S-4	SLO-1	Distribution Function	Population	Range Restriction	Use of P Values in Definition Decision Making	Continuos Time Markov Chain
	SLO-2	Probability Distributions	Sample Group	Simple Regression	Testing Hypothesis about mean of a population	Martingales
S-5	SLO-1	**Unit 2: Why Statistics is Required for an AI Implementation**	**Unit 5: Overview of Statistical Thinking**	**Unit 8: Distributions**	**Unit 11: Bivariate Transformations**	Brownian Methods and its Applications
	SLO-2	Building Knowledge Based Expert Systems	Example of Statistical Thinking	Standard Probability Distributions	Getting Started with Bivariate Transformations	Renewal Processes
S-6	SLO-1	Develop Problem Solving Skills	Numerical Data, Summary Statistics	Sampling Distributions	Transformation of Densities	Branching Processes
	SLO-2	Generate AI Models	Population to Sampled Data	Concept of Sampling and Sampling Distribution	Convolution	Poisson's Processes
S-7	SLO-1	Interpret AI Models	Different Type od Biases	Chi-Square Distribution	Univariate Vs Bivariate Vs Multivariate Transformation	**Unit 14: Real Life Application of Statistics in Linear Regression, Time Series Analysis**
	SLO-2	Abstract Generation of Numerical Results	Associaltion and Dependence	Students Distribution	Distribution of the sum of Poisson variables	Simple Linear Regression for Students Marks Prediction
S-8	SLO-1	Conformance Evaluation	Associaltion and Causation	Snedecor's Distribution	Sum and difference of normal variables	Simple Linear Regression for Patient Weight Reduction
	SLO-2	Integration in Design	Conditional Probabilty and Bayes Rule	Relation among Normal, Chi-Square, t and F Distributions	Distribution of the ratio of normal variables	Simple Linear Regression for Patient Weight Reduction
S-9	SLO-1	**Unit 3: Statistical Skills Matrix Required for an AI Implementation**	**Unit 6: Descriptive Statistics**	**Unit 9: Theory of Estimation**	**Unit 12: Sampling Methods**	Simple Linear Regression for Online Advertising
	SLO-2	Problem Solving Skill	Sampling Techniques	Getting Started with Theory of Estimation	Getting Started with Sampling Methods	Simple Linear Regression for Financial Support Decisions
S-10	SLO-1	Knowledge and Reasoning Skill	Data Classification	Point Estimation	Probabilty Samplng	Time Series - Economic Forecasting
	SLO-2	Inferential Skills	Tabulation	Mean Square Estimation	Overview of simple random sampling	Time Series - Sales Forecasting
S-11	SLO-1	Formulating Hypothesis Skills	Frequency and graphic Representation	Likelihood Estimation	Overview of systematic sampling	Time Series -Budegetary Analysis
	SLO-2	Comparison Classification Skills	Measures of Central Tendency	Method of Moments	Overview of Stratified sampling	Time Series -Stock Market Analysis

S-12	SLO-1	Identifying Variables Skills	Measures of Variation	Method of Maximum Likelihood	Overview of Clustered sampling	Time Series - Process and Quality Control
	SLO-2	Designing Experimental Skills	Quartiles and Percentiles	Criteria of Estimation	Non-Probabilty Samplng	Time Series -Census Analysis

Learning Resources	1. https://deepsphereai.litmos.com/ 2. Pratap Dangeti, Statistics for Machine Learning, Practical Statistics for Data Scientists, 2nd Edition, 2020 Andrew Bruce and Peter Gedeck, 3. Davis Freedman, Robert Pisani and Roger Purves, An Easy to Understand Guide to Statistics and Analytics, Third Edition, By David M. Levine and David F. Stephan, December 2014 4. Robert A. Donnelly and Fatma Abdel-Raou, Statistics, 3E, July	5. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan & Chand & Sons, New Delhi, 11th Ed, 2002. 6. Hastie, Trevor, et al. "The elements of Statistical Learning", Springer, 2009. 7. Ross, S.M., "Introduction to Probability and Statistics", Academic Foundation, 2011. 8. Papoulis, A. and Pillai, S.U. , "Probability, Random Variables and Stochastic Processes", TMH, 2010

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
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