Programme	BSc Statistics				
Course Code	STA2MN105 (P)				
Course Title	Introduction to Probability				
Type of Course	Minor				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Understanding of fundamental probability concepts. Ability to manipulate and analysze basic data sets, perform simple calculations.				
Course Summary	Deepen statistical knowledge with correlation types, regression properties, and probability theory, including the relationship between correlation and regression coefficients, alongside introducing probability concepts, random variables, and distribution functions, applied through practical exercises.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Comprehend types of correlation and scatter diagrams and analyze data to help entrepreneurial decisions using critical thinking skills.	U	C	Instructor-created exams / Quiz/ Instructor-created exams
CO2	Understand properties of regression coefficients and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Introduce and apply probability theory concepts.	U	C	Seminar Presentation / Group Tutorial Work
CO4	Grasp the definition and types of	U	C	Instructor-crea

	random variables.			ted exams / Home Assignments
CO5	Develop critical thinking skills to interpret and communicate results of statistical analysis effectively.	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Describe how to draw scatter plot for correlation in JASP.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	**Unit**	**Content**	**Hrs (45+30)**	**Marks 70**
I		**Correlation**	**12**	**15**
	1	Bivariate Distribution, Correlation	2	
	2	Scatter Diagram	1	
	3	Karl Pearson coefficient of correlation	2	
	4	Limits for Correlation Coefficient	2	
	5	Assumptions Underlying Karl Pearson's Correlation Coefficient	1	
	6	Rank Correlation	3	
	Sections from References: Unit 1: 10.1 Ref[2] Unit 2: 10.2 Ref[2] Unit 3: 10.3 Ref[2] Unit 4: 10.3.1 Ref[2] Unit 5: 10.3.2 Ref[2] Unit 6: 10.6 Ref[2]			

II	**Regression**		**14**	**20**
	7	Regression	2	
	8	The two regression lines	3	
	9	Regression coefficients	3	
	`10	Properties of regression coefficients	3	
	11	Relation between coefficient of correlation and regression coefficients	3	
	Sections from References: Unit 7: 10.7 Ref[2] Unit 8: 10.7.1 Ref[2] Unit 9: 10.7.3 Ref[2] Unit 10: 10.7.4 Ref[2] Unit 11: 10.7.4 Ref[2]			
III	**Introduction to Probability**		**10**	**15**
	12	Terms in Probability	3	
	13	Mathematical or Classical Probability	1	
	14	Statistical or Empirical Probability	1	
	15	Axiomatic approach to Probability	2	
	16	Addition theorem for two events (statement only)	1	
	17	Conditional Probability	2	
	18	Independence of events		

	Sections from References: Unit 12: 4.3 Ref[2] Unit 13: 4.3.1 Ref[2] Unit 14: 4.3.2 Ref[2] Unit 15: 4.5 Ref[2] Unit 16: 4.6.2 Ref[2] Unit 17: 4.7 Ref[2] Unit 18: 4.7.3 Ref[2]			
IV	**Random variables**		**9**	**20**
	19	Definition of random variable	2	
	20	Probability mass function	2	
	21	Probability density function	2	
	22	Distribution function	3	
	Sections from References: Unit 19: 5.1 Ref[2] Unit 20: 5.6 Ref[2] Unit 21: 5.4.1 Ref[2] Unit 22: 5.4 Ref[2]			
V	**PRACTICUM**		**30**	
	Do practice problems in JASP software from any 5 units of the given list and one additional problem decided by the teacher-in-charge, related to the content of the course. Other units listed here may be used as demonstrations of the concepts taught in the course.			
	1	Problems on plotting scatter plots		
	2	Correlation calculation		
	3	Interpretation of correlation coefficient in JASP		

	4.	Finding Rank correlation		
	5	Introduce correlation matrix in JASP		
	6	Linear regression model		
	7	Model checking		
	8	Model selection		
	Sections from References: Unit 1: 11.1.1 Ref[4] Unit 2: 11.1.3 Ref[4] Unit 3:11.1.5 Ref[4] Unit 4: 11.1.6 Ref[4] Unit 5: 11.2 Ref[4] Unit 6: 11.3 Ref[4] Unit 7:11.10 Ref[4] Unit 8:11.11 Ref[4]			

Books and References:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I , 8th Edn. The World Press, Kolkata.
2. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi
3. Garrett, H.E. and Woodworth, R.S. (1973) Statistics in Psychology and education. Vakils, Feffer and Simons Private Ltd, Bombay.
4. Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners. (Version).

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	2	3	2	-	-	2	2	1	-	-	3	-

CO 2	2	-	-	-	-	-	1	2	-	-	-	3
CO 3	-	3	-	2	2	2	2	1	2	-	-	-
CO 4	3	2	-	-	-	3	3	2	-	-	-	-
CO 5	2	-	-	-	-	-	2	2	-	-	-	-
CO 6	2	2	3	-	-	3	3	2	-	3	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓

CO 2	✓	✓		✓
CO 3	✓			✓
CO 4		✓		✓
CO 5	✓	✓		✓
CO 6	✓			