

Programme	BSc Statistics				
Course Code	STA2MN103 (P)				
Course Title	Regression and probability theory				
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	Basic knowledge about set theory, fundamental concepts of data				
Course Summary	This course covers dispersion, correlation, regression, and probability theory with practical applications using R programming, enhancing students' statistical skills for diverse scenarios.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Utilize dispersion measures effectively in practical scenarios and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Quiz
CO2	Demonstrate mastery in correlation, regression, and their applications and analyze data to help entrepreneurial decisions using critical thinking skills.	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Comprehend and employ basic probability concepts and theorems.	U	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Explain fundamental concepts of probability theory including events, sample space, outcomes.	U	C	Instructor-created exams / Home Assignments
CO5	Understand and employ conditional probability and Bayes' theorem	U	C	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Implement R for creating scatter plots and performing statistical calculations.	Ap	P	Viva Voce/ Instructor-created

				ed 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	Measures of dispersion		10	10
	1	Range	1	
	2	Quartile deviation	3	
	3	Standard deviation	3	
	4	Coefficient of variation	3	
	Unit 1: 2.1.3 Ref[1] Unit 2: 2.1.3 Ref[1] Unit 3: 2.1.3 Ref[1] Unit 4: 2.1.3 Ref[1]			
II	Correlation and regression		13	20
	5	Bivariate distribution, correlation	1	
	6	Scatter diagram	2	
	7	Karl Pearson coefficient of correlation	2	
	8	Limits of Correlation coefficient	2	
	9	Regression	2	
	10	Lines of regression	3	
	11	Regression coefficients	2	
	Unit 5: 10.1 Ref[2] Unit 6: 10.1Ref[2] Unit 7: 10.3 Ref[2] Unit 8:10.3.1 Ref[2] Unit 9: 10.7 Ref[2] Unit 10: 10.7.1 Ref[2] Unit 11:10.7.3 Ref[2]			
	III	Probability theory		10
12		Random experiment	1	
13		Samplespace	1	
14		Event	1	
15		Classical Probability-definition	2	
16		Statistical probability-definition	2	
17		Axiomatic approach to Probability	2	
18		Addition theorem (Statement only)	1	
Unit 12:4.5.1 Ref[2] Unit 13: 4.5.1 Ref[2] Unit 14: 4.5.2 Ref[2] Unit 15: 4.3.1 Ref[2] Unit 16: 4.3.2 Ref[2]				

	Unit 17: 4.5 Ref[2] Unit 18: 4.6.2 Ref[2]			
IV	Conditional Probability		12	15
	18	Conditional Probability of two events	3	
	19	Multiplication theorem (Statement only)	2	
	20	Independence of events	2	
	21	Conditions of mutual independence of three events	2	
	22	Bayes theorem and its applications (Statement only)	3	
	Unit 18: 4.7 Ref[2] Unit 19: 4.7 Ref[2] Unit 20: 4.7.3 Ref[2] Unit 21: 4.7.5 Ref[2] Unit 22: 4.8 Ref[2]			
V	PRACTICUM		30	
	Do practice problems in R 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	cor() function		
	2	Use of cor() function with missing values in data		
	3	ggplot		
	4	Diagrammatic representation of data		
	5	Graphical representation of data		
	6	Measures of central tendency (Any two)		
	7	Measures of dispersion (Any two)		
8	Any two exercises of above			
	Sections from References: Unit 1: 6.2 Ref[3] Unit 2: 6.2 Ref[3] Unit 3: 6.3 Ref[3] Unit 4: 2.2 Ref[4] Unit 5: 2.3 Ref[4] Unit 6: 2.4 Ref[4] Unit 7: 2.5 Ref[4] Unit 8: 2.8 Ref[4]			
Books and References: <ol style="list-style-type: none"> 1. S.P Gupta (2021), Statistical Methods 46 th Edition 2. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi 3. Douglas, Alex, Deon Roos, Francesca Mancini, Ana Couto, and David Lusseau. (2020), <i>An Introduction to R</i>. https://intro2r.com/index.html. 4. Sudha G. Purohit (2008), Statistics using R, Alpha Science International 				

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