Course Code	STA1MN102 (P)				
Course Title	Applied statistics using R				
Type of Course	Minor				
Semester	I				
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 in the Descriptive Measures				
Course Summary	Upon successful completion of this course, students will possess a solid understanding of fundamentals of sampling concepts, index numbers, vital statistics and R software.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Explain the importance of sampling as a method for gathering data and making inferences about populations	U	C	Instructor-created exams / Quiz
CO2	Describe the ability to implement simple random sampling techniques and understand their advantages and limitations.	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Develop skills in interpreting index numbers and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	C	Seminar Presentation / Group Tutorial Work
CO4	Explain the significance of vital statistics in capturing essential demographic information and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Home Assignments
CO5	Understand various methods of collecting vital statistics.	R	F	One Minute Reflection Writing assignments/ Instructor-create

				d exams
CO6	Demonstrate the ability to write and execute simple R scripts.	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	Units	Content	Hrs (45 +30)	Marks (70)
I		**SAMPLING METHODS**	10	15
	1	Population and Sample, Census and Sampling Method	1	
	2	Advantages and Limitations of Sampling	1	
	3	Principal steps in a sample survey	1	
	4	Sampling and Non-Sampling Errors	1	
	5	Types of sampling (Purposive, Probability, Mixed)	1	
	6	Simple Random Sampling (Concept and Method of Selection)	2	
	7	Stratified Random Sampling	2	
	8	Systematic Random Sampling	1	
	Sections from References: Unit 1: 15.2,15.3,15.6 [Ref 1] Unit 2: 15.6,15.7[Ref 1] Unit 3: 15.8 [Ref 1] Unit 4: 15.9.1[Ref 1] Unit 5:15.10[Ref 1] Unit 6:15.11,15.11.1 [Ref 1] Unit 7: 15.12,15.12.1 [Ref 1] Unit 8: 15.13 [Ref 1]			
II		**INDEX NUMBERS**	10	25
	9	Introduction and Uses of Index Numbers	1	
	10	Types of Index Numbers	1	
	11	Problems in the construction of Index Number	1	

	12	Methods of Construction of Index Numbers- Simple and Weighted Index Number	5	
	13	Tests for an Ideal Index Number- Time Reversal Test and Factor Reversal Test	2	
	Sections from References: Unit 9: 10.1&10.2[Ref 1] Unit 10: 10.3 [Ref 1] Unit 11: 10.4[Ref 1] Unit 12: 10.5 [Ref 1] Unit 13:10.6.2&10.6.3 [Ref 1]			
III	**VITAL STATISTICS**		11	20
	14	Introduction to Vital Statistics	1	
	15	Uses of Vital Statistics	2	
	16	Collection of Vital Statistics-Registration Method, Census Enumeration Method, Survey Method, Analytical Method	2	
	17	Measures of Fertility –Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (ASFR). Total Fertility Rate (TFR) (Concept and Problems)	3	
	18	Measurement of Mortality- Crude Death Rate (CDR), Specific Death Rate (ASDR), Standardized Death Rate (SDR), Infant Mortality Rate, Maternal Mortality Rate(Concept and Problems)	3	
	Sections from References: Unit 14: 16.2 [Ref 2] Unit15: 16.2&16.3 [Ref 2] Unit 16: 16.3&16.4[Ref 2] Unit 17: 16.5&16.6 [Ref 2] Unit 18:16.14,16.15,16.16,16.18 [Ref 2]			
IV	**INTRODUCTION TO R**		14	10
	19	Installation & Basic Mathematical Operations	1	
	20	R Preliminaries	1	
	21	Methods of Data Input	1	
	22	Graphical Representations (R Code)	4	
	23	Diagrammatic Representations (R Code)	3	
	24	Descriptive Measures (Mean, Median, Mode, Range,	4	

		Standard deviation, variance)		
	Sections from References: Unit 19: 1.2&1.3 [Ref 5] Unit 20: 1.4 [Ref 5] Unit 21: 1.5&1.6 [Ref 5] Unit 22: 1.8,2.3 [Ref 5] Unit 23:2.2 [Ref 5] Unit 24: 2.4,2.5 [Ref 5]			
	PRACTICUM			
V	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.		30	
	1	Basic mathematical operations and R preliminaries		
	2	Methods of data input		
	3	Data accessing or indexing		
	4	Built in functions in R		
	5	Graphical representations (R Code)		
	6	Diagrammatic representations (R Code)		
	7	Mean, Median, Mode		
	8	Range, Standard deviation, variance		
	Sections from References: Unit 1: 1.3&1.4 [Ref 5] Unit 2: 1.5 [Ref 5] Unit 3: 1.6 [Ref 5] Unit 4: 1.7 [Ref 5] Unit 5: 1.8 [Ref 5] Unit 6: 2.2 [Ref 5] Unit 7: 2.4 [Ref 5] Unit 8: 2.5 [Ref 5]			

Books and References:

1. Gupta, S. C.. (2015). Fundamentals of Statistics, Himalaya Publishing House
2. Gupta S.P (2021), Statistical Methods, 46 th edition, Sultan Chand and Sons.
3. Gupta, S. C. and Kapoor, V. K. (2014). Fundamentals of applied Statistics, Sultan Chand and Sons.
4. The R book(2007) , Michael J. Crawley John Wiley Series
5. Sudha G Purohith, Sharad D Core, Shailaja R Deshmukh (2015), Statistics Using R

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

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	✓			

Programme	BSc Statistics
Course Code	STA2MN102 (P)
Course Title	Probability theory II
Type of Course	Minor