Four Year UG Program
Syllabus - Minor

Programme	BSc Statistics				
Course Code	STA1MN101 (P)				
Course Title	Descriptive Statistics for Data Science				
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 of data, variables, charts and graphs, Basic computer skills				
Course Summary	This course aims to equip students with a holistic understanding of different data types and probability, enabling them to make informed decisions and draw meaningful conclusions from data.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Describe different types of data	U	F	Instructor-created exams / Quiz
CO2	Compare and differentiate various types of data	U	C	Instructor-created exams / Home Assignments
CO3	Visualize different types of data and analyze data to help entrepreneurial decisions using critical thinking skills.	R	P	Seminar Presentation / Group Tutorial Work
CO4	Summarize various descriptive measures of data and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Home Assignments
CO5	Define basic terms in probability	R	F	One Minute

					Reflection Writing assignments
CO6	Solving uncertainty with sample data with spread sheet	Ap	P		Viva-Voce/Practical Assignment/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	Hours (45 +30)	Marks (70)
I		**Introduction to Statistics**	**8**	**10**
	1	Basic terms and types of Variables	2	
	2	Collection of data- Primary and secondary data,	2	
	3	Methods of collecting primary data	2	
	4	Sources of Secondary data	2	
	Sections from References: Unit 1: 1.2&1.3 [Ref 3] Unit 2: 2.2 [Ref 2] Unit 3: 2.3 [Ref 2] Unit 4: 2.5 [Ref 2]			
II		**ORGANIZING AND GRAPHING DATA**	9	**15**
	5	Frequency Distribution	2	
	6	Cumulative Frequency distribution	2	
	7	Diagrammatic Representations	3	
	8	Graphical Representation of data	2	
	Sections from References: Unit 5: 3.3 [Ref 2] Unit 6: 3.5 [Ref 2] Unit 7: 4.3(4.3.2 to 4.3.7) - [Ref 2] Unit 8: 4.4(4.4.3 to 4.4.5)- [Ref 2]			
III		**NUMERICAL DESCRIPTIVE MEASURES**	**12**	**25**
	9	Measures of central tendency	1	
	10	Arithmetic Mean	2	
	11	Median and Mode	2	
	12	Geometric mean and Harmonic Mean	2	
	13	Partition values	1	

	14	Measures of dispersion	3	
	15	Skewness and Kurtosis (Concept only)	1	
	Sections from References: Unit 9: 2.4 [Ref 1] Unit 10: 2.5 [Ref 1] Unit 11: 2.6, 2.7 [Ref 1] Unit 12: 2.8, 2.9 [Ref 1] Unit 13: 2.11 [Ref 1] Unit 14: 2.13 [Ref 1] Unit 15: 2.16, 2.17 [Ref 1]			
IV		**PROBABILITY**	16	20
	16	Random Experiment, Sample Space, Events (Basic terminology), Three Conceptual Approaches to Probability	2	
	17	Addition theorem (for two and three events) and simple problems	2	
	18	Conditional probability	3	
	19	Multiplication theorem of probability	2	
	20	Independent events and its Multiplication Theorem	2	
	21	Pairwise and mutual independence (Concept and Problems)	2	
	22	Baye's theorem	3	
	Sections from References: Unit 16: 3.3, 3.4, 3.5, 3.6 & 3.8 [Ref 1] Unit 17: 3.9 [Ref 1] Unit 18: 3.10[Ref 1] Unit 19: 3.11 [Ref 1] Unit 20: 3.12, 3.13& 3.14 [Ref 1] Unit 21: 3.15[Ref 1] Unit 22: 4.2 [Ref 1]			
V		**PRACTICUM**	30	
		Do practice problems in spreadsheet 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	Types of data		
	2	Introduction to spreadsheet		
	3	Frequency distributions for organizing and summarizing data		
	4	Histograms		
	5	Graphs that enlighten and graphs that deceive		

	6	Measures of central tendency		
	7	Measures of dispersion		
	8	Measures of Relative Standing and Boxplots		
	Sections from References: Unit 1: 1.2 Ref [5] Unit 2: 1.4 Ref [5] Unit 3: 2.1 Ref [5] Unit 4: 2.2 Ref [5] Unit 5: 2.3 Ref [5] Unit 6: 3.1 Ref [5] Unit 7: 3.2 Ref [5] Unit 8: 3.3 Ref [5]			

Books and References:

1. Gupta, S. C. and Kapoor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th edition, Sulthan Chand, New Delhi
2. **Gupta, S. C. (2015). Fundamentals of Statistics, Himalaya Publishing House.**
3. Prem S. Mann (2016), Introductory Statistics 9 th Edition, Wiley
4. Neil A. Weiss, Introductory Statistics, 9th Edition, Addison Wesley Pearson Learning (2011)
5. Mario F Triola, Elementary Statistics using Excel, (2018), 6th edition.

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