Course Code	STA1MN110 (P)				
Course Title	Basic statistics and data visualization				
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

Course Summary	Through theoretical concepts and practical applications, students will develop the skills necessary to classify data, organize frequency distributions, and calculate and interpret measures of central tendency and dispersion.

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define and differentiate between primary data and secondary data, and understand the advantages and disadvantages of each type in research and analysis.	U	C	Instructor-created exams / Quiz
CO2	Classify data into quantitative and qualitative categories and recognize their characteristics and appropriate analysis techniques and analyze data to help entrepreneurial decisions using critical thinking skills.	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Construct frequency distributions for discrete and continuous variables, including cumulative frequency distributions, to summarize and organize data effectively and critically evaluate ethical implications of statistical methods aligning with human values.	U	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Calculate positional values such as quartiles, deciles, and percentiles, and interpret their significance in understanding the distribution of data.	Ap	C	Instructor-created exams / Home Assignments
CO5	Apply measures of dispersion to assess the consistency or variability of data points within a data set and make comparisons between different data sets.	Ap	C	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Apply spreadsheet functions to calculate measures of central tendency and dispersion.	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	**Introduction of data**		**9**	**15**
	1	Types of data- Primary data, Secondary data, Quantitative data, Qualitative data, Discrete data, Continuous data	2	
	2	Frequency distributions for discrete and continuous variables- Cumulative frequency distribution	2	
	3	Histogram, Frequency Polygon	3	
	4	Frequency Curve, Ogives	2	
	Sections from References: Unit 1: 2.2-2.5 [Ref 3] Unit 2: 3.3 [Ref 3] Unit 3&4: 4.3-4.4 [Ref 3]			
II	**Measures of central tendency**		**9**	**15**
	5	Mean	2	
	6	Median, Mode	3	
	7	GM	2	
	8	HM	2	
	Sections from References: Unit 5: 2.5 [Ref 1] Unit 6: 2.6&2.7 [Ref 1] Unit 7: 2.8[Ref 1] Unit 8: 2.9[Ref 1]			
III	**Measures of dispersion**		**19**	**25**
	9	Positional values – Quartiles	2	
	10	Deciles	2	
	11	Percentiles	1	
	12	Range	1	
	13	Quartile deviation	3	
	14	Mean deviation	3	
	15	Standard deviation	3	
	16	Coefficient of variation	1	
	17	Coefficient of dispersion	3	
	Sections from References: Unit 9,10&11: 2.10,2.11[Ref 1] Unit 12,13,14&15: 2.12,2.13[Ref 1] Unit 16&17: 2.14[Ref 1]			
IV	**Statistical Quality Control**		**8**	**15**

	18	Concept of statistical quality control, assignable causes and chance causes, process control.	2	
	19	Construction of control charts, 3sigma limits	2	
	20	Control chart for variables: Mean chart and Range chart	2	
	21	Control chart for attributes: c chart	1	
	22	np chart	1	
	Sections from References: Unit 18: 25-1.1,1.2,2 [Ref 2] Unit 19: 25-3.1,3.2,3.3[Ref 2] Unit 20: 25:4.1,4.3[Ref 2] Unit 21: 25:5.4[Ref 2] Unit 22: 25:5.1[Ref 2]			
V	**PRACTICUM**		**30**	
	1	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. Frequency distributions for organizing and summarizing data 3. Graphs of frequency distribution 4. Arithmetic mean 5. Median and Mode 6. Partition of values 7. Measure of dispersion 8. Different charts in quality control		
	Sections from References Unit 1: 1.2 Ref [4] Unit 2: 2.1 Ref [4] Unit 3: 2.2 Ref [4] Unit 4: 3.1 Ref [4] Unit 5: 3.2 Ref [4] Unit 6: 3.3 Ref [4] Unit 7: 3.4 Ref [4] Unit 8:2.2 Ref[4]			
Books and References:				

1. Gupta,S.C. and Kapoor,V.K.(2002).Fundamentals of Mathematical Statistics. , 11th edition, Sulthan Chand, New Delhi.
2. Gupta, P.K. and Man Mohan. (1987). Operations Research and Statistical Analysis, Third edition, Sultan Chand, New Delhi.
3. Gupta, S. C.(2015). Fundamentals of Statistics, Himalaya Publishing House.
4. Mario F Triola, Elementary Statistics using Excel, (2018), 6th edition.

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	3	2	-	-	-	-	1	-	-	-	-	-
CO 2	-	-	3	-	2	2	-	-	-	2	3	-
CO 3	-	-	-	-	-	-	2	-	-	-	-	3
CO 4	1	-	-	-	-	3	-	3	-	-	-	-
CO 5	-	3	2	2	-	-	-	-	3	-	-	-
CO 6							-	-	-	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	✓			