Programme	BSc Statistics				
Course Code	STA1MN103 (P)				
Course Title	Introductory statistics with 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 about data, basic mathematical knowledge				
Course Summary	This course covers data types, distributions, graphs, and statistical measures using R programming. Students learn to analyze data effectively for informed decision-making across diverse domains.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Identify data types and construct frequency distributions.	U	C	Instructor-created exams / Quiz
CO2	Create diverse graphical representations effectively and critically evaluate ethical implications of statistical methods aligning with human values.	Ap	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Calculate and apply central tendency measures practically and analyze data to help entrepreneurial decisions using critical thinking skills..	Ap	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Use measures of central tendency to summarize and describe data, demonstrating the ability to communicate the findings in both written and graphical formats	U	C	Instructor-created exams / Home Assignments
CO5	Master R programming basics and descriptive statistics.	Ap	C	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Implement R for practical data analysis and graphical representation.	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	**Data**		**12**	**15**
	1	Types of data: Primary data, Secondary data, Quantitative data, Qualitative data, discrete data, continuous data	4	
	2	Frequency distribution: Ungrouped and grouped	4	
	3	Cumulative frequency distribution	4	
	Unit 1:2.2,11.1,2.1 Ref[1] Unit 2: 2.2 Ref[1] Unit 3: 3.5 Ref[3]			
II	**Graphical representation of data**		**9**	**15**
	4	Line diagram, Bar diagram	3	
	5	Pictogram, Pie diagram, Histogram	3	
	6	Frequency Polygon, Frequency curve, Ogives.	3	
	Unit 4: 4.3.3 Ref[3] Unit 5:4.3.4, 4.3.6 Ref[3] Unit 6: 4.4.3 Ref[3]			
III	**Measures of central tendency**		**10**	**25**
	7	Arithmetic Mean	2	
	8	Median	2	
	9	Mode	2	
	10	Geometric mean	2	
	11	Harmonic mean	2	
	Unit 7: 5.4 Ref[3] Unit 8: 5.6.1 Ref[3] Unit 9: 5.7.1 Ref[3] Unit 10: 5.9 Ref[3] Unit 11: 5.10 Ref[3]			
IV	**Introduction to R programming**		**14**	**15**
	12	Installing R	1	
	13	Objects in R	1	
	14	Using functions in R	1	
	15	Importing data	1	
	16	Exporting data	1	
	17	Simple base R plots	2	
	18	Multiple graphs	2	

	19	R packages	1	
	20	Exporting plots	2	
	21	Getting help	1	
	22	Saving stuff in R	1	
	Unit 12: 1.1 Ref[2] Unit 13: 2.2 Ref[2] Unit 14: 2.3 Ref[2] Unit 15: 3.3 Ref[2] Unit 16: 3.6 Ref[2] Unit 17: 4.2 Ref[2] Unit 18: 4.4 Ref[2] Unit 19: 1.5 Ref[2] Unit 20: 4.5 Ref [2] Unit 21: 2.5 Ref[2] Unit 22: 2.6 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	Functions in R— data.frame		
	2	multiply_columns()		
	3	return()		
	4	identical()		
	5	Conditional statements-if and else		
	6	Combining logical operators		
	7	For loop		
	8	While loop		
	Sections from References: Unit 1: 7.2 Ref[2] Unit 2: 7.2Ref[2] Unit 3: 7.2Ref[2] Unit 4: 7.2Ref[2] Unit 5: 7.3Ref[2] Unit 6: 7.4 Ref[2] Unit 7: 7.5.1 Ref[2] Unit 8: 7.5.2 Ref[2]			

Books and References:

1. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi

2. Douglas, Alex, Deon Roos, Francesca Mancini, Ana Couto, and David Lusseau. (2020), *An Introduction to R*. https://intro2r.com/index.html.

3. S.C. Gupta, Fundamentals of Statistics, Himalaya Publishing house,

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

Programme	BSc Statistics
Course Code	STA1MN105 (P)
Course Title	Descriptive statistics
Type of Course	Minor
Semester	I
Academic	100 - 199

Level					
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Familiarity with different types of data, understanding of common data visualization techniques, basic algebraic concepts.				
Course Summary	Build a foundation in data understanding, covering primary/secondary, quantitative/qualitative data, along with graphical representation like bar diagrams, central tendency, and dispersion measures, leading to practical survey and software applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand data types and sampling techniques and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Quiz
CO2	Master diagrammatic representation and frequency distribution	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Apply measures of central tendency with practical examples and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Grasp measures of dispersion and their applications	U	C	Instructor-created exams / Home Assignments
CO5	Conduct a survey and apply acquired skills using software	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Exlapin how to calculate measures of central tendency and dispersion using JASP software.	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
I	**A basic idea about data**		**6**	**15**
	1	Primary and secondary data	3	
	2	Quantitative and qualitative data	1	
	3	Population and sample, Sampling and census	1	
	4	Discrete and continuous data	1	
	Sections from References: Unit 1: 2.2 [Ref 2] Unit 2: 11.1 [Ref 2] Unit 3: 12.1 [Ref 1] Unit 4: 2.1 [Ref 2]			
II	**Diagrammatic representation of data**		**15**	**15**
	5	Bar diagrams, pie diagram, Pictograms	5	
	6	Four types of classification	1	
	7	Frequency distribution, discrete and continuous frequency tables	6	
	8	Terms used in a frequency distribution, Cumulative frequency tables	3	
	Sections from References: Unit 5: 4.3(4.3.2 to 4.3.7) [Ref 2] Unit 6: 5.3 Ref[2] Unit 7: 3.3[Ref 2] Unit 8: 3.5 [Ref 2]			
III	**Measures of central tendency**		**14**	**20**

	9	Mean, Median, Mode	9	
	10	Geometric mean and Harmonic mean with simple applications	4	
	11	Empirical relation connecting mean, median and mode	1	
	Sections from References: Unit 9: 2.5,2.6,2.7 [Ref 1], Chapter 2 [Ref 3] Unit 10: 2.8,2.9 [Ref 1] Unit 11: 2.7 [Ref 1]			
IV	**Measures of dispersion**		**10**	**20**
	12	Range, Standard deviation,	4	
	13	Quartile deviation	4	
	14	Coefficient of variation	2	
	Sections from References: Unit 12: Section 1 and 4, Chapter 3 [Ref 3] Unit 13: Section 2, Chapter 3 [Ref 3] Unit 14: 3.8.1 [Ref 1]			
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	Installing JASP		
	2	Loading data in JASP		
	3	Quitting JASP		

	4	Calculating mean in JASP		
	5	Calculating Median in JASP		
	6	Calculating mode in JASP		
	7.	Calculating range in JASP		
	8	Calculating interquartile range in JASP		
	Sections from References: Unit 1: 3.1 Ref[4] Unit 2: 3.3 Ref[4] Unit 3: 3.6 Ref[4] Unit 4: 4.1.2 Ref[4] Unit 5: 4.1.3 Ref[4] Unit 6: 4.1.6 Ref[4] Unit 7: 4.2.1 Ref[4] Unit 8: 4.2.2 Ref[4]			

Books and References:

1. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi

2. S.P Gupta (2021),Statistical Methods 46 th Edition

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

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	STA1MN109 (P)				
Course Title	Elementary statistics				
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 mathematics, including algebra and calculus. Familiarity with geographical concepts and spatial data.				

Course Summary	To equip students with the fundamental principles of statistical analysis and their application in geographical contexts, enabling them to effectively analyze, interpret, and communicate spatial data.

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Recognize the importance of statistical methods in geographical research and analysis.	U	C	Instructor-created exams / Quiz
CO2	Evaluate different types of data used in geography, including qualitative and quantitative variables, and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Calculate and interpret measures of central tendency, such as mean, median, and mode, and measures of dispersion, including range, variance, and standard deviation, in the context of geographical data analysis.	Ap	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Analyze higher-order moments or other numerical measures of the characteristics of distributions, such as skewness and kurtosis, and interpret their implications for spatial patterns and trends and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Home Assignments
CO5	Introduce the concepts of correlation and regression analysis and their applications in geography, including assessing the strength and direction of relationships between variables and making predictions based on statistical models.	U	C	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Demonstrate measures of central	Ap	P	Viva Voce/ Instructor-creat

	tendency using spreadsheet.			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)				

COURSE CONTENT

Module	Unit	Content	Hours (45 +30)	Marks (70)
1		**STATISTICS AND GEOGRAPHY**	**10**	**15**
	1	Statistical Analysis and Geography	1	
	2	Data, sources of data, internal data, external data, primary and secondary data, meta data	2	
	3	Data collection, characteristics of data sets	2	
	4	Quantitative and qualitative data sets	1	
	5	Measurement Evaluation: Validity, accuracy, precision	2	
	6	Data and Information	1	
	Sections from References: Unit 1: 1, 1.1 [Ref 1] Unit 2: 1.2 [Ref 1] Unit 3: 1.2 [Ref 1] Unit 4: 1.2 [Ref 1] Unit 5: 1.3 [Ref 1] Unit 6: 1.4 [Ref 1]			
2		**DISPLAYING AND INTERPRETING DATA**	**12**	**15**
	7	Organization of data	2	
	8	Classification	2	
	9	Frequency distribution	2	

	10	Basic principles for forming a groupes frequency distribution	2	
	11	Cumulative and bivariate frequency distribution	2	
	12	Tabulation, requisites of a good table	2	
	Sections from References: Unit 7: 3.1 [Ref 2] Unit 8: 3.2 [Ref 2] Unit 9: 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.4 [Ref 2] Unit 10: 3.4, 3.4.1, 3.4.2, 3.4.3, 3.4.4 [Ref 2] Unit 11: 3.5, 3.5.1, 3.5.2, 3.6 [Ref 2] Unit 12: 3.7, 3.7.2 [Ref 2]			
3	**REPRESENTATIONS OF DATA**		**14**	**25**
	13	Types of diagrams	1	
	14	Graphical representation of data	3	
	15	Limitations of diagrams and graphs	1	
	16	Measures of Central Tendency:	4	
	17	Selection and limitations of an average	2	
	18	Measures of Dispersion	3	
	Sections from References: Unit 13: 4.3.2, 4.3.3, 4.3.44.3.6, 4.3.7 [Ref 2] Unit 14: 4.4.2, 4.4.3, 4.4.4 [Ref 2] Unit 15: 4.5 [Ref 2] Unit 16: 5.4,5.6, 5.7, 5.8, 5.9, 5.10 [Ref 2] Unit 17: 5.12, 5.13 [Ref 2] Unit 18: 6.5, 6.6, 6.9 [Ref 2]			
4	**CORRELATION AND REGRESSION**		**10**	**15**
	19	Correlation	2	
	20	Correlation coefficient	2	

	21	Regression	3	
	22	Lines of regression	3	
	Sections from References: Unit 19: 8.1, 8.1.1, 8.1.2, 8.3 [Ref 2] Unit 20: 8.4 [Ref 2] Unit 21: 9.2 [Ref 2] Unit 22: 9.3, 9.3.1, 9.3.2, 9.3.4 [Ref 2]			
5	**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. James E. Burt_ Gerald M. Barber_ David L. Rigby - Elementary Statistics for Geographers-The Guilford Press (2009) 2. Gupta, S. C.. (2015). Fundamentals of Statistics,			

	Himalaya Publishing House. 3. J. Chapman McGrew Jr., Arthur J. Lembo Jr., Charles B. Monroe - An Introduction to Statistical Problem Solving in Geography, Third Edition-Waveland Press, Inc. (2014) 4. Mario F Triola, Elementary Statistics using Excel.		

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

Programme	BSc Statistics				
Course Code	STA1MN111				
Course Title	Fundamentals of data analysis				
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	Competence in basic algebraic concepts, knowledge of basic data visualization techniques.				
Course Summary	Provide students with a comprehensive understanding of different types of data, methods of data collection, frequency distributions, graphical representation techniques, measures of central tendency and dispersion, positional values, and utilization of statistical tools like R for data analysis.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Differentiate between quantitative and qualitative data and identify suitable methods for their collection and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Quiz
CO2	Construct frequency distributions for both discrete and continuous variables.	U	c	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Calculate measures of central tendency including mean, median, mode, geometric mean, and harmonic mean and analyze data to help entrepreneurial decisions using critical thinking skills.	U	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Understand what dispersion means in the context of statistics and why it matters.	U	C	Instructor-created exams / Home Assignments
CO5	Apply positional values such as quartiles, deciles, and percentiles to analyze data distribution.	Ap	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Utilize R as a calculator, statistical software, and programming language for data analysis.	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	3	
	11	Percentiles	1	

	12	Range	1	
	13	Quartile deviation	2	
	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	**Introduction to R programming**		**8**	**15**
	18	Installation & Basic Mathematical Operations	2	
	19	R Preliminaries, Methods of Data Input	2	
	20	Graphical Representations (R Code)	2	
	21	Diagrammatic Representations (R Code)	1	
	22	Descriptive Measures (Mean, Median, Mode)	1	
	Sections from References: Unit 18&19: 1.2&1.3 [Ref 2] Unit 20: 1.4 [Ref 2] Unit 21: 1.5&1.6 [Ref 2] Unit 22: 1.8,2.3 [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. Basic mathematical operations 2. Frequency distributions for organizing and summarizing data 3. Histogram 4. Frequency curve		

		5. Pie diagram 6. Arithmetic mean 7. Median 8. Mode		
	Sections from References: Unit 1: 1.8 Ref[2] Unit 2: 1.9 Ref[2] Unit 3: 2.1 Ref[2] Unit 4: 2.2 Ref[2] Unit 5:2.2 Ref[2] Unit 6: 2.3 Ref[2] Unit 7: 2.3 Ref[2] Unit 8: 2.3 Ref[2]			
Books and References: 1. Gupta, S. C. and Kapoor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th edition, Sulthan Chand, New Delhi. 2. Sudha G Purohith, Sharad D Core, Shailaja R Deshmukh (2015), Statistics Using R. 3. Gupta, S. C.(2015). Fundamentals of Statistics, Himalaya Publishing House.				

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
CO 2	-	2	-	3	1	-	-	-	1	-	-	-
CO 3	-	-	2	-	-	1	-	-	2	-	3	-
CO 4	1	2	-	-	-	-	2	-	-	-	-	-

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

Programme	BSc Statistics				
Course Code	STA1FM105(2)				
Course Title	Fundamentals of Statistics				
Type of Course	MDC				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic mathematical knowledge				
Course Summary	Students will learn about different types of data, scales of measurement, and techniques for representing and summarizing data using measures of central tendency and dispersion, as well as exploring concepts of skewness and kurtosis.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define statistics and its scope in various fields of study, including its role in decision-making.	U	C	Instructor-created exams / Quiz
CO2	Construct tables and diagrams to organize and summarize data efficiently for analysis and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	C	Instructor-created exams / Seminar Presentation
CO3	Create various types of diagrams such as bar graphs, pie charts, and histograms for visual representation of	Ap	F	Seminar Presentation / Group Tutorial Work/

	data and critically evaluate ethical implications of statistical methods aligning with human values.			Instructor-created exams
CO4	Compute measures of central tendency including mean, median, and mode to identify typical or central values within a data set.	Ap	C	Instructor-created exams / Home Assignments
CO5	Interpret partition values such as quartiles and percentiles to identify specific data points within a distribution.	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Illustrate measures of central tendency and dispersion using spread sheet.	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)				

COURSE CONTENT

Module		Content	Hours (36+9)	Marks (50)
1	**Introduction to Statistics**		**8**	**10**
	1	Definition of Statistics	1	
	2	Scope of Statistics	2	
	3	Concepts of statistical population and sample	2	
	4	Collection of data	3	
	Sections from References: Unit 1: 1.1&1.2 [Ref 1] Unit 2: 1.3 [Ref 1] Unit 3: 1.3 [Ref 2] Unit 4: 1.4 [Ref 2]			
2	**Organizing and Graphing Data**		**12**	**15**
	5	Types of data	3	
	6	Scale of measurements	2	
	7	Classification of data	2	
	8	Tabulation of data	2	
	9	Diagrammatic representation of data	3	

	Sections from References: Unit 5: 2.1 [Ref 2] Unit 6: 2.1 [Ref 1] Unit 7: 2.1[Ref 1] Unit 8: 2.3[Ref 2] Unit 9: 2.2 [Ref 1 and 2]			
3	**Measures of Central Tendency & Dispersion**		**11**	**15**
	10	Arithmetic Mean	2	
	11	Geometric Mean	1	
	12	Harmonic Mean	1	
	13	Median & Mode	2	
	14	Measures of Dispersion - Definition	1	
	15	Absolute Measures of Dispersion	4	
	Sections from References: Unit 10: 2.3, 2.4 & 2.5 [Ref 1] Unit 11: 2.8 [Ref 1] Unit 12: 2.9[Ref 1] Unit 13: 2.6 & 2.7[Ref 1] Unit 14: 3.1 [Ref 1] Unit 15: 3.4,3.5,3.6, & 3.7 [Ref 1]			
4	**Skewness & Kurtosis**		**5**	**10**
	16	Partition values	3	
	17	Skewness	1	
	18	Kurtosis	1	
	Sections from References: Unit 16: 2.11 [Ref 1] Unit 17: 3.13 [Ref 1] Unit 18: 3.14[Ref 1]			
5	**Open ended: practical problems Using Spreadsheet**		**9**	
	1	Frequency distributions for organizing and summarizing data	3	
	2	Measures of Central Tendency	3	
	3	Measures of Dispersion	3	
	Sections from References: Unit 1: 2.1Ref [3] Unit 2: 2.2 Ref [3] Unit 3: 3.2 Ref [3]			
	Books and References:			

	▪ Gupta, S. C. and Kapoor, V. K. (2002). Fundamentals of Mathematical Statistics. , 11th edition, Sulthan Chand, New Delhi. ▪ Prem. S. Mann (2010). Introductory Statistics, 7th edition, Wiley ▪ 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	-	-	1	-	2	-	2	1	-	-	-	-
CO 2	2	2	-	-	-	2	2	2	-	-	-	3
CO 3	-	-	3	-	-	-	1	-	-	-	3	-
CO 4	2	2	3	-	3	2	2	-	2	3	-	-
CO 5	-	2	-	2	2	3	2	3	2	-	-	-
CO 6	3	2	-	-	-	3	3	-	-	3	-	-

Correlation Levels:

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

Assessment Rubrics:

6. Quiz / Assignment/ Quiz/ Discussion / Seminar
7. Midterm Exam
8. Programming Assignments (20%)
9. 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	B. Sc. Statistics				
Course Code	STA2FM106(1)				
Course Title	Managerial Decision Making				
Type of Course	MDC				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	HSE level Mathematics Course				
Course Summary	To make students aware of importance of managerial decisions and the use of Statistical theories in developing scientific decisions				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Explain various decision making environments in management	U	C	Instructor-created exams / Quiz/ Seminar presentation
CO2	Discuss the outcome of any payoff	R	F	Practical Assignment / Instructor-created exams
CO3	Assessing the purpose of Inventory for smooth Business operations and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Explain the simulation of a real system	U	C	Instructor-created exams / Home Assignments